Aviation Activity Forecasts

JUNE 2021 **DRAFT**

Introduction

Aviation activity and based aircraft forecasts are developed in this chapter to assess future demand at Truckee-Tahoe Airport (TRK). TRK is a unique market for aviation activity. The Airport serves diverse clientele, is located in a challenging setting in the mountains, and is located in close proximity to world class resorts and outdoor activities. Aircraft operations have steadily increased over the past 20 years. Studies and data have shown that aviation activity at TRK is influenced by the Airport's location and relation to the Truckee - Lake Tahoe area and the economic health of the region and nation.

Forecasts use Federal Aviation Administration (FAA) fiscal year 2019 as the base year and are prepared for the next 20 years (2020-2040). A range of forecast scenarios were prepared for high, medium, and low growth activity levels using different methodologies that incorporate regression analysis, research, and industry knowledge. Forecast trend analyses consider 10 years of historical data. The primary data source for historical operations at TRK is the Airport's flight monitoring system.

The preferred forecasts, once identified, are then compared to the FAA Terminal Area Forecast (TAF), issued January 2020. The Airport is asking for FAA approval of the preferred operations and based aircraft forecast.

IMPACTS OF COVID-19 PANDEMIC

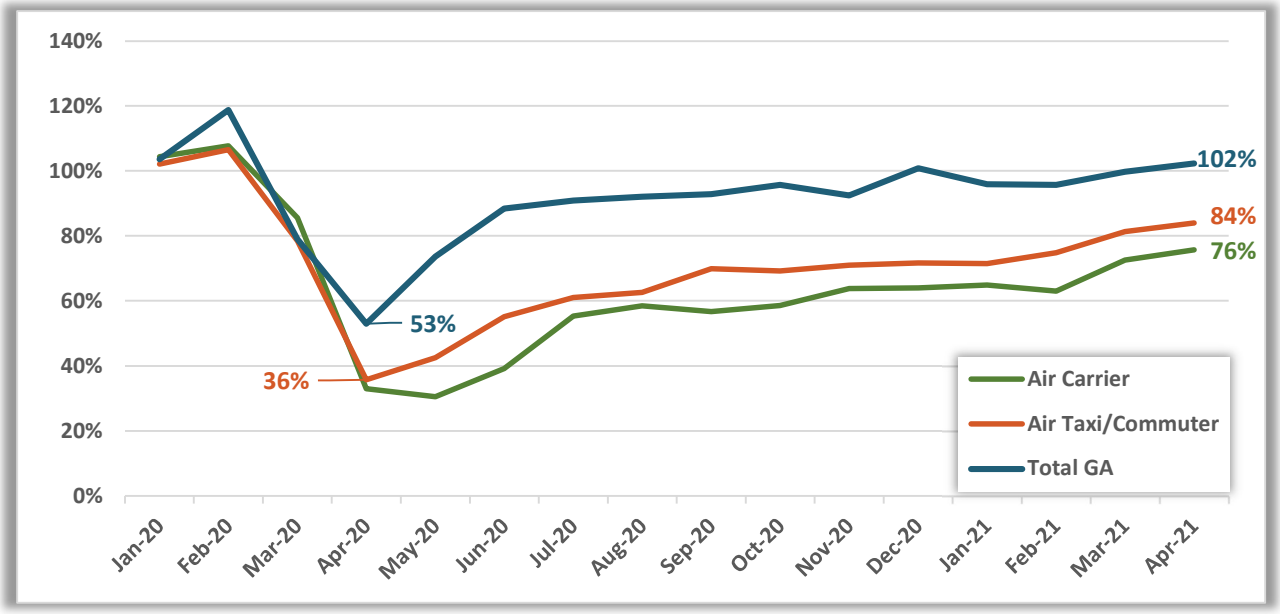
The COVID-19 pandemic has greatly disrupted aviation in the short term, and its long-term effects are yet to be determined. Initial reports have shown that general aviation traffic has experienced a faster recovery than commercial aviation as a segment of the flying public looks to avoid commercial aircraft and airport terminals.

This forecast was developed during a period where the near-to-mid-term effects of COVID-19 on general aviation activity is unknown. Regulations and reactions to the continued spread of COVID-19 and the possible development of vaccines serve as sources of uncertainty as to how and when aviation demand will recover. The forecasts consider the impacts COVID-19 had on activity at TRK in 2020 and present a projected timetable to return to pre-pandemic activity levels.

COVID-19 Effects on the General Aviation Industry

The pandemic's effect on general aviation industry was different from its effect on commercial airlines. While general aviation did decline because of COVID-19, it did not have the drop in operations that the commercial operators did. According to the FAA Air Traffic Activity System (ATADS) accessed in January 2021 nationwide, general aviation operations dropped less and recovered faster than commercial service and returned to pre-COVID-19 levels in December 2020. Commercial airlines saw operations and enplanements drop dramatically in March and April 2020, similar to impacts from September 11, 2001, and estimates on full recovery vary throughout the industry. As of May 2021, municipalities have begun to rollback social distancing and mask regulations after the CDC announced that masks for people who are vaccinated are no longer required. **Figure 2-1** shows the change in operations per month between 2020 and 2019 by general aviation, air carrier, and air taxi.

Figure 2-1: Domestic Operations – 2020-2021 Comparison to Same Month 2019



Source: FAA Air Traffic Activity System (ATADS)

According to the General Aviation Manufacturers Association (GAMA, Flightglobal.com, September 15, 2020), business and private aircraft manufacturers have avoided a downturn in business as opposed to commercial aircraft manufacturers during the height of COVID-19. GAMA reports that shipments in the second quarter of 2020 were down less than 25 percent during the same period last year. This is significantly less than Airbus, Boeing and other airliner manufacturers, which have seen deliveries fall sharply as passengers stopped flying, and airlines ground entire fleets.

GAMA notes flight activity for US domestic business operations to be at 85 percent of pre-COVID-19 levels, as of December 2020. GAMA also notes that piston, turboprop and rotorcraft movements have increased since April 2020. There is belief that general aviation and business aircraft operations will remain strong as customers consider this a viable alternative to commercial airlines. People with the means to travel by general aviation through private charter have chosen this method over commercial service and will likely continue to prefer this method for leisure and business travel during the pandemic recovery period, and potentially after.

COVID-19 Effects on Operations at TRK

Operations at TRK decreased about nine percent in the first eight months of 2020 compared to the same period in 2019, which is equivalent to 4,200 operations. TRK returned to 2019 operations levels in September 2020, and operations in October 2020 outpaced those in October 2019. Jet fuel sales in 2020 dropped only 4.3 percent below 2019 sales. This drop did not match the reduction in overall operations likely due to fuel prices being low in 2020, and jet operators taking advantage of these prices.

Nationally, general aviation operations decreased by 50 percent from February 2020 to April 2020. Aggregate operations at peer airports (detailed in the Peer Airport Forecast section) were down about 3.5 percent from 2019 to 2020. The peer airports share similar characteristics as TRK: located near resort or outdoor destinations, in mountainous terrain, and where general aviation and charter operations dominate. Some of the peer airports may accommodate Part 139 air service, but these operations are a small fraction of total operations.

There is also a trend of people moving out of urban areas and relocating to the Truckee-Tahoe area, either long-term or permanently. This is addressed specifically in the Regional Analysis section below. The 2015 AMP estimated that 50 percent of homeowners in Truckee are not permanent residents. However, due to COVID-19, people have left their primary home near an urban area (San Francisco or Los Angeles, for example) and relocated to the Truckee area. Professionals and higher income individuals who have the means, are relocating to take advantage of remote work or school situations.

The forecasts presented below consider the effects of the COVID-19 pandemic on operations at TRK and show a near-term time frame for annual operations to return to 2019 levels. Reasons include the appeal of general aviation and charter service as a viable alternative to commercial airlines, the recovery of the national economy, and the appeal of the Truckee-Tahoe area as a permanent residence or part-time destination. At TRK, operations levels returned to pre-COVID-19 levels in September 2020, and nationally, general aviation returned to pre-COVID-19 levels in December 2020. COVID-19 is addressed again in the operations forecast, with sustained operations expected to remain at or above 2019 levels in 2021.

Historical Activity and Trends

Historical data for operations and based aircraft at TRK are presented and reviewed in this section. This data will be compared to previous forecasts such as the 2015 Airport Master Plan (AMP) and FAA TAF. The historical data will then be used to project operation and based aircraft forecasts for this update. As stated earlier, the impact of COVID-19 is accounted for by establishing 2019 as the base year.

TRK Recorded Operations

Since 2007, TRK has recorded operations through various methods to disclose airport operations, categorized by aircraft type, to the local community. The original intent for this data was to monitor operators and nighttime operations, and to produce quarterly noise reports. This data also provides a highly accurate description of operations for forecasting purposes and includes specific aircraft models, time and date of operation, and the runway used.

The first camera system was the WASP by ITT Exelis, which was installed in 2007 and upgraded in 2010. This system includes four cameras located on the taxiways near each departure runway end. Data captured by the WASP was audited by TRK staff and multiplied by two to account for arrivals. The WASP was replaced by the Vector Airport System in 2014. This system has cameras placed at various points along the taxiways and runways to record departures for aircraft departing and arriving. The Vector system recognizes that one aircraft may pass multiple cameras during one operation and will correct this duplication to one operation. TRK staff audit the system for any other discrepancies or duplications that the system may not initially recognize.

The Vector system is considered highly accurate by TRK staff. This data is used for official monthly reports that are approved by the Truckee-Tahoe Airport District (TTAD) Board. It is recommended that historical FAA records be updated to match these operations. It is also recommended the FAA consider these historical operations when evaluating the preferred operations forecast.

Air Traffic Control Tower

A seasonal air traffic control tower was constructed in 2017 to enhance communication with pilots and improve operation efficiency. The tower was converted to year-round operation in 2019. A benefit of the air traffic control tower is staff is able to observe and record operations, and this data supplements the Vector data to provide a more complete picture of operations at TRK.

Calendar Year Versus Fiscal Year

The annual TRK operations report that TTAD approves each year presents data by calendar year (CY). The FAA reports operations data and forecasts by their fiscal year (FY), October 1 through September 30. For historical data presented below, the CY is used to match the TRK annual reports.

The data from 2019 is from October 2018 through September 2019 and was extracted from TRK records. This FY 2019 will be used as the base year for all forecasts. Forecasts will be shown in FY to satisfy FAA requirements. Forecasts will also match the FAA template for reporting operations by showing local versus itinerant operations, air taxi, and based aircraft by type.

AIRCRAFT OPERATIONS

Historical data and trends can be an indicator of future aviation activity. The previous 10 years of operation data are presented in **Table 2-1** below. The operations monitoring system was not installed prior to 2009; however, TRK management reports that traffic was about 20 percent higher prior to the 2008/2009 Recession. Touch-and-go operations are added manually because the camera system cannot record them due to camera location near the runway ends. Touch-and-go activity was estimated to be 20 percent of single-engine piston operations in the 2015 Master Plan. This formula has been carried forward by TRK staff to estimate touch-and-go data. The formula for future touch-and-go data is revisited for the forecasts. Operations data categorized by aircraft type to match the format of TRK monthly reports.

An **operation** is defined as either the landing or the takeoff of an aircraft.

Table 2-1: Historical Operations

Aircraft Type	2009[3]	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Piston	8,401	8,659	8,610	8,484	8,047	8,293	10,676	14,262	14,978	15,937	16,775
Piston T&G[1]	1,680	1,732	1,722	1,697	1,609	1,659	2,135	2,852	2,996	3,187	3,355
Piston Twin	1,560	1,208	1,182	931	1,042	1,110	1,524	1,205	1,145	1,176	1,269
Turboprop	2,941	2,593	2,602	3,116	3,036	3,691	5,756	6,413	6,942	6,840	6,346
Jet 2 (< 12.5k lbs)	n/a	n/a	n/a	n/a	n/a	n/a	924	918	960	896	998
Jet 3 (12.5-20k lbs)	661	516	500	441	1,046	1,276	1,290	1,331	1,599	1,751	1,658
Jet 4 (20 - 50k lbs)	355	644	590	642	946	1,027	970	1,164	1,274	1,606	1,504
Jet 5 (50k+ lbs)	600	413	447	583	974	1,145	227	261	307	296	270
Helo	390	1,500	1,467	1,666	1,638	1,333	1,138	1,190	1,229	1,013	985
Gliders Only	1,376	2,622	2,748	2,748	2,445	2,445	2,554	2,890	2,573	2,666	3,287
Glider Tow Plane[2]	1,376	2,622	2,748	2,748	2,445	2,445	2,554	2,890	2,573	2,666	3,287
TOTAL	**19,339**	**22,509**	**22,616**	**23,056**	**23,227**	**24,423**	**29,748**	**35,376**	**36,576**	**38,034**	**39,734**

1 T&G: Touch-and-go operations. Historically calculated as 20 percent of piston operations, based on formula derived by TRK staff.
2 A glider tow plane is a single-engine piston aircraft but is separated into its own category to match TRK reporting preferences.
Source: TRK Airport records. Data in calendar year.
3 The operations monitoring system was not installed prior to 2009, and TRK management reports that traffic was 20 percent higher prior to the 2008/2009 Recession.

Itinerant Operations

The FAA classifies operations as itinerant and local. Generally, itinerant operations are by aircraft that depart to and arrive from another airport, and local operations are by aircraft that stay within the traffic pattern or within a 20-mile radius of an airport.

Deciphering local and itinerant operations at TRK, even with air traffic control data, is not an exact science. While arrivals and departures are easy to track at TRK with the runway cameras, tracking aircraft destinations and origins is not as simple. The advent of ADS-B that TRK has recently installed will help make this data more available.

Itinerant and Local Operations

Itinerant: Operations by aircraft that arrive from outside the traffic pattern or depart the airport traffic pattern.

Local: Operations by aircraft that stay within the traffic pattern airspace, which include:

- Operating in the local traffic pattern or within sight of the airport
- Known to be departing for, or arriving from flight in local practice areas located within a 20-mile radius of the airport; or
- Executing simulated instrument approaches or low passes at the airport.

Discussions in November 2020 with TRK staff, flight training operators, and air traffic control tower staff indicated that local operations may be estimated as a formula of operations by certain aircraft types. All touch-and-go and glider tow plane operations are local operations since these operate within the traffic pattern and return to the Airport. Piston aircraft are the primary training aircraft at TRK, and local training operators will typically fly to practice areas within a 20-mile radius of TRK, therefore remaining in TRK's local definition. Gliders generally fly within the local traffic pattern, but it was found that a significant portion depart TRK and land at another airport.

This formula projects that 50 percent of single-engine piston, 50 percent of gliders, 100 percent of touch-and-go, and 100 percent of glider tow plane operations equal the local operation count. This formula was vetted with TRK staff, on-airport flight trainers, and TRK tower staff. Using this formula, the 2019 and historical local – itinerant split is show in **Table 2-2**.

Table 2-2: Historical Itinerant and Local Operations

Operation Type	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Local[1]	7,944	9,994	10,149	10,061	9,300	9,472	11,304	14,318	14,344	15,155	16,673
%	41.1%	44.4%	44.9%	43.6%	40.0%	38.8%	38.0%	40.5%	39.2%	39.8%	42.0%
Itinerant	11,395	12,515	12,467	12,995	13,928	14,951	18,444	21,058	22,232	22,880	23,061
%	58.9%	55.6%	55.1%	56.4%	60.0%	61.2%	62.0%	59.5%	60.8%	60.2%	58.0%

1 Local operations = 50% single-engine piston + 100% touch-and-go + 100% tow + 50% glider.
Source: TRK Airport records. Data in calendar year

Air Taxi Operations

Air taxi operations are defined by the FAA as takeoffs and landings by aircraft that transport regional passengers or cargo on scheduled commercial flights, non-scheduled, or for-hire flights with aircraft with seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less. Air taxi operations at TRK in 2019 were identified using Vector data. Most – but not all – charter operators will file a flight plan, and this will generate a call sign that is recorded in the Vector data that can be used to identify air taxi operations. The remaining air taxi operations were identified through conversations with tower staff. It was estimated that air taxi operations made up 12 percent of total TRK operations (4,755) in 2019.

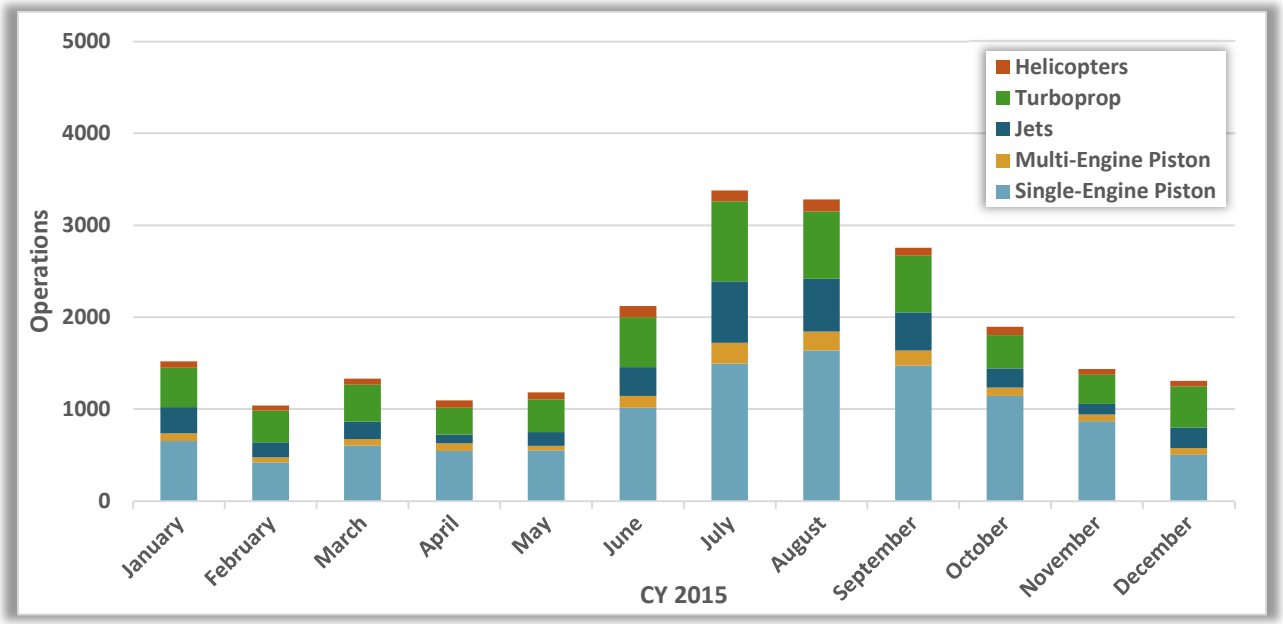
With the air traffic control tower being relatively new, historical data for air taxi operations is incomplete. The 2015 AMP showed 1,000 air taxi operations at TRK, which was in line with the FAA TAF and did not project a specific air taxi forecast. TRK staff is confident that air taxi operations have increased over the past 10 years, with locally based and itinerant on-demand air taxi operators such as Mountain Lion and Surf Air and fractional ownership companies such as NetJets being more prominent.

Operations Per Month

TRK experiences seasonal variations in activity. Historically, there are more operations at TRK in the summer months, as people take advantage of outdoor activities in the Lake Tahoe region. **Figure 2-2** shows operations by month for 2015, and **Figure 2-3** shows operations by month for 2019. This data shows the distribution of operations throughout the year, and provides a snapshot of how much operations have increased for each month over the past five years. Among the findings from the monthly operations comparison:

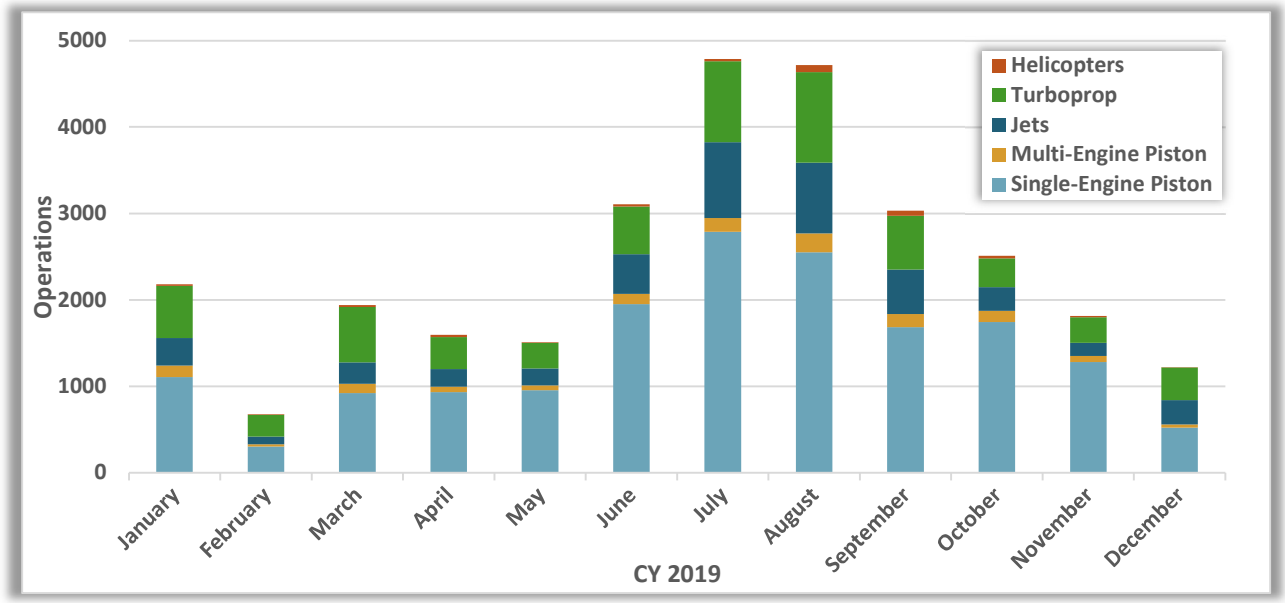
- Operations continue to be highest in the summer months.
- The shoulder season is becoming more popular for visitors, as indicated by the increase in operations for April, May, September, October, and November.
- Operations are up in each month from 2015 to 2019, except for February.

Figure 2-2: Operations Per Month: CY 2015



Source: TRK Airport records

Figure 2-3: Operations Per Month: CY 2019



Source: TRK Airport records

BASED AIRCRAFT

The based aircraft counts come from multiple sources. TRK has maintained a comprehensive list of based aircraft since 2012, which is presented in **Table 2-3**.

Table 2-3: Historical Based Aircraft Inventory

Aircraft Type	2012	2013	2014	2015	2016	2017	2018	2019	2020
Single-Engine Piston	151	137	165	168	174	173	172	177	173
Multi-Engine Piston	14	14	21	20	20	20	21	20	15
Turboprop	5	7	13	13	13	13	16	18	26
Jet	4	4	10	8	6	7	4	4	7
Helicopter	3	4	8	8	8	8	9	10	6
Other[1]	4	6	9	9	9	9	8	9	11
Total	**181**	**172**	**226**	**226**	**230**	**230**	**230**	**238**	**238**

1 Other includes ultralights and gliders.
Source: TRK Airport records

The FAA maintains a list of based aircraft at each airport in the country through the National Based Aircraft Inventory Program (basedaircraft.com, NBAIP). The FAA defines a validated based aircraft in the NBAIP as an aircraft that is "operational and air worthy" and based at an airport for most of the year. This validated list does not contain duplicate aircraft that base at multiple airports. The FAA's purpose with the validated NBAIP list is to count each aircraft in the national system once. The FAA validated inventory does not account for aircraft that do not hangar year-round or declare that TRK is that aircraft's home base.

The NBAIP also inventories unvalidated aircraft, which include those that spend fewer than six months of the year at TRK. These can be considered "seasonal" aircraft that are based elsewhere for weather, financial, or other reasons. The NBAIP inventory list differs from the TRK inventory list, likely based on the frequency at which the list is updated. The FAA TAF records historical and forecasted based aircraft and this also differs from the NBAIP list and TRK inventory due to limited historical updates.

The number of based aircraft is significantly higher during the summer and winter peaks than during the spring and fall. The term "based aircraft" in this plan refers to aircraft stored at the Airport, either permanently or seasonally. Each inventory list for 2020 is presented in **Table 2-4** below with the five FAA standard reporting aircraft categories.

Table 2-4: 2020 Based Aircraft Inventory

Aircraft Type	TRK Inventory	FAA Validated	FAA Inventory	FAA TAF
Single-Engine[1]	173	97	174	95
Multi-Engine[1]	15	8	20	14
Turboprop[1]	26	N/A	N/A	N/A
Jet	7	1	6	0
Helicopter	6	4	4	4
Other[2]	11	0	0	4
Total	**238**	**110**	**204**	**117**

1 Aircraft categories match FAA reporting groups. FAA groups turboprops in single-engine and multi-engine categories.
2 Other includes ultralights and gliders.
Sources: TRK Airport records, National Based Aircraft Inventory Program, and 2019 FAA TAF.

For forecasting based aircraft, both the TRK inventory and NBAIP validated inventory will be used. The TRK inventory list is updated quarterly by airport staff. This is considered to be accurate and up to date. The TRK inventory forecast will be used to justify hangar demand for permanent and seasonal based aircraft. Many TRK operators that rent hangars home-base elsewhere but still use TRK on a regular basis. Forecasting using the TRK Inventory will provide true representation of hangar demand. The NBAIP validated list will also be forecasted to satisfy the FAA requirement of showing aircraft that base at TRK year-round.

Operations by Based Aircraft

Table 2-5 shows the operations by all based aircraft at TRK, from 2015 to 2019. This was developed from the TRK Vector data and cross-referencing N-number of based aircraft with operations in the Vector database. Operations by based aircraft have increased to almost 40 annual operations for each aircraft based at TRK in 2019.

Table 2-5: Operations by Based Aircraft

	2015	2016	2017	2018	2019
Operations	7131	8643	8388	9901	9342
Based Aircraft	226	230	230	230	238
Ops per Based Aircraft	**31.6**	**37.6**	**36.5**	**43.0**	**39.3**

Source: TRK Airport records

Previous Aviation Forecasts

A review of previous forecasts can provide important information about the underlying assumptions used in their development for comparison with changed conditions and current outlook. A summary of previously published forecasts follows.

FAA AEROSPACE FORECASTS: FISCAL YEARS 2020 – 2040

The FAA Aerospace Forecasts (ASF) provide a macro-level analysis of U.S. aviation activity. The forecasts are published annually and detail the underlying drivers of aviation demand. These forecasts correlate total aviation activity with economic activity. They also project changes to aircraft fleet mix, hours of operation by category of aircraft, and the number of active pilots.

The information from the 2020-2040 ASF will apply to the activity forecasts in this chapter. The national general aviation aircraft fleet mix information from the ASF will be used to inform operations forecasts. It should be noted that the ASF was released before the global effects of COVID-19 were realized.

Major conclusions of the forecasts are summarized below. **Table 2-6** projects annual growth by aircraft category and hours flown. **Table 2-7** projects changes to the entire U.S. general aviation fleet as a percentage of the total general aviation fleet. The following points summarize the major trends identified by the FAA.

- The long-term outlook for general aviation is stable, mainly driven by turbine aircraft activity. The total active general aviation fleet is expected to decline a total of 1.0 percent from 2020 to 2040, just under zero percent on an annual basis. However, total hours flown by the general aviation fleet are projected to increase by 16 percent during the same period (an average of 0.7 percent annually) with the growth in turbine, rotorcraft, and experimental aircraft flight hours offsetting the decline in fixed wing piston hours.
- The turbine-powered fleet (jets and turboprops) is projected to grow at an average rate of 1.8 percent between 2020 and 2040. Growth in U.S. gross domestic product and corporate profits are catalysts for the use of more expensive and sophisticated turbine aircraft. Hours flown by turbine aircraft are expected to increase 2.2 percent annually between 2020 and 2040 with jet aircraft, specifically business jets, accounting for the bulk of this growth.
- The rotorcraft fleet is projected to grow by 1.6 percent between 2020 and 2040. Hours flown by rotorcraft is expected to increase 2.1 percent during the same period.
- The rate at which fixed-wing piston aircraft are expected to shrink is an average of 1.0 percent annually. This decline is attributed to pilot demographics as older pilots retire without younger pilots having interest in piston aircraft, the increasing cost of aircraft ownership, and the availability of lower cost alternatives for recreational flying. This is indicated by the declining new aircraft deliveries not keeping up with older aircraft retirements.
- Currently the smallest category, light-sport-aircraft are expected to grow at an average 3.3 percent annually, which will double the 2020 fleet size by 2040.
- The number of active general aviation pilots is projected to increase 0.1 percent per year between 2020 and 2040.

Table 2-6: Average Annual Growth Rates through 2040

Active GA Fleet	2010-2020	2020-2030	2020-2040
Single-Engine Piston	-0.8%	-1.0%	-1.0%
Multi-Engine Piston	-2.2%	-0.4%	-0.5%
Turbo-Jet Turbine	3.0%	2.6%	2.2%
Turbo-Prop Turbine	0.6%	0.8%	1.2%
Piston Rotorcraft	-1.2%	1.4%	1.4%
Turbine Rotorcraft	1.0%	1.8%	1.7%
Other[1]	-0.5%	1.1%	1.1%
General Aviation Fleet	-0.5%	-0.1%	0.0%
Hours Flown	**2010-2020**	**2020-2030**	**2020-2040**
Single-Engine Piston	-0.3%	-1.5%	-1.0%
Multi-Engine Piston	-1.0%	-0.5%	-0.3%
Turbo-Jet Turbine	4.0%	3.1%	2.6%
Turbo-Prop Turbine	1.9%	1.1%	1.3%
Piston Rotorcraft	-2.1%	2.6%	2.3%
Turbine Rotorcraft	-0.6%	2.2%	2.0%
Other[1]	-1.7%	0.3%	0.2%
General Aviation Fleet	0.5%	0.6%	0.7%

1 Other aircraft include experimental, sport aircraft, airships, balloons, and gliders.
Source: FAA Aerospace Forecast 2020-2040

Table 2-7: Fleet Mix as a Percentage of Total General Aviation

Active GA Fleet	2010	2020	2030	2040
Single-Engine Piston	62.5%	60.5%	55.0%	49.6%
Multi-Engine Piston	7.1%	6.0%	5.8%	5.5%
Turbo-Jet Turbine	5.1%	7.3%	9.5%	11.4%
Turbo-Prop Turbine	4.2%	4.7%	5.1%	6.0%
Piston Rotorcraft	1.6%	1.5%	1.7%	2.0%
Turbine Rotorcraft	2.9%	3.4%	4.1%	4.8%
Other[1]	16.6%	16.6%	18.8%	20.7%
Hours Flown	**2010**	**2020**	**2030**	**2040**
Single-Engine Piston	49.0%	45.5%	37.0%	31.9%
Multi-Engine Piston	7.3%	6.3%	5.7%	5.1%
Turbo-Jet Turbine	13.6%	19.3%	24.7%	27.6%
Turbo-Prop Turbine	9.4%	10.8%	11.3%	12.1%
Piston Rotorcraft	3.2%	2.5%	3.0%	3.4%
Turbine Rotorcraft	10.5%	9.4%	11.1%	12.1%
Other[1]	6.9%	6.2%	7.2%	7.8%

1 Other aircraft include experimental, sport aircraft, airships, balloons, and gliders.
Source: FAA Aerospace Forecast 2020-2040

Unmanned Aircraft Systems

The ASF also include projections for the emerging sector of unmanned aircraft systems (UAS). UAS involve flight by aircraft with no onboard pilot/operator. UAS were developed initially as a military application (e.g., drone aircraft), but they have great potential to cross into commercial and civilian markets. Among other roles, UAS are expected to be viable for search and rescue operations. As of 2020, the FAA is developing a series of plans to integrate UAS into the National Airspace System, which involves the development of standards, airworthiness criteria, certification, and procedures for sense and avoid systems, and command control and communication system requirements. In December 2015, an Interim Final Rule on "Registration and Marking Requirements for Small Unmanned Aircraft" was published. In December of 2020, the FAA announced rules for UAS, to be published in 2021, that require remote identification that allows operators of small drones to fly over people and at night under certain conditions. Forecasts project near-term growth in small unmanned systems will include about 7,500 aircraft that would be operating within 5 years of authorization.

FAA TERMINAL AREA FORECAST

The FAA publishes the TAF for airports included in its National Plan of Integrated Airport Systems (NPIAS). These forecasts are prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public. The TAF represents the FAA's policy benchmark for federal review and approval of airport master plan forecasts. TAF projections are updated annually using federal FY activity values, not CY. The 2020 TAF was not released on time due to COVID 19; therefore, this forecast uses the 2019 TAF. A summary of the 2019 TAF is contained in **Table 2-8.**

Table 2-8: TRK Terminal Area Forecasts

Year	Aircraft Operations				Based Aircraft
	Itinerant Air Taxi	Itn. GA & Military	Local GA	Total	
2010	1,000	13,000	21,000	35,000	76
2015	1,000	13,000	21,000	35,000	120
2020	1,000	13,000	21,000	35,000	117
2030	1,000	13,000	21,000	35,000	117
2040	1,000	13,000	21,000	35,000	117
CAGR	0.0%	0.0%	0.0%	0.0%	1.4%

Source: FAA Terminal Area Forecasts (2019)
CAGR: Compound Annual Growth Rate.

The TAF operations forecast is flat at 35,000 annually, while based aircraft increased from 76 to 117 in the last decade. Comparing the TAF operations to actual operation counts at TRK using the Vector system shows discrepancies. Historic TAF activity totals for TRK are overestimated until 2017 and underestimated for the rest of the forecast period.

The TAF numbers for operations and based aircraft are essential to any forecast, and the preferred forecast will be compared to the TAF. However, it should be noted that operations records kept by TRK over the past 10 years are more accurate than FAA TAF data, and it is suggested the FAA update the TAF's historical operations for TRK to match this data.

2015 AIRPORT MASTER PLAN

The previous AMP, completed in 2015, included forecasts of aviation activity through 2025 with base year 2012. Base year operations for the AMP were lower than average due to operations still recovering from the 2008/2009 Great Recession. The forecast methodologies used in that AMP were assessed and updated as part of the development of this forecast update. **Table 2-9** shows the 2015 AMP forecasts for total operations, and based aircraft forecasts are presented in **Table 2-10**.

Table 2-9: 2015 AMP Operations Forecast

	2012	2015	2020	2025
Single-Engine Piston	13,726	14,118	15,182	16,330
Multi-Engine Piston	1,481	1,429	1,535	1,650
Turboprop	2,866	2,981	3,247	3,536
Jet	1,532	2,039	2,222	2,419
Helicopter	1,616	1,648	1,794	1,955
Gliders[1]	5,250	5,250	5,250	5,250
Total	**26,471**	**27,465**	**29,230**	**31,140**
Local	14,902	15,687	17,087	18,612
Itinerant	11,568	11,777	12,142	12,527

1 For the 2015 AMP, glider activity included glider operations and the operations by the glider tow plane.
Source: 2015 TRK Airport Master Plan

The 2015 AMP slightly underestimated total operations at TRK. Operations in 2019 according to TRK records were over 39,000. The 2015 AMP projected under 30,000 operations in 2020. The forecasts in the 2015 AMP also underestimated the growth in turboprop and jet operations. The technology that records actual operations at TRK has also improved since the 2015 AMP, providing a more accurate count of arrivals and departures.

Table 2-10: 2015 AMP Based Aircraft Forecast

	2012	2015	2020	2025
Single-Engine Piston	156	157	158	160
Multi-Engine Piston	12	12	12	12
Turboprop	27	29	34	41
Jet	13	18	24	32
Helicopter	6	6	7	8
Total	**217**	**222**	**235**	**253**

Source: 2015 TRK Airport Master Plan

The 2015 AMP projected 235 based aircraft at TRK in 2020, near the actual total of 238. The 2015 AMP showed future hangars that were constructed by TRK and filled in 2019.

Regional Analysis

A variety of local and regional factors influence aviation activity at TRK. These regional factors include visitor travel profile, area population, employment and income trends, educational profile, area property values, and other factors such as non-residential development. This section assesses the primary characteristics unique to Truckee and the north side of Lake Tahoe.

The socioeconomic data, pulled from various sources, covers different geographic areas, depending on the data source and the factor. These are the primary data sources:

- **Woods & Poole Economics, Inc (W&P)** provided socioeconomic data for gap years in the U.S. Census with records from 1970 to 2019 and forecasts through 2050.
- **California Department of Finance** provided socioeconomic data for various California communities.
- **United States Census** provided socioeconomic data; however, this forecast was prepared before the 2020 Census data was released.

These are the different geographic areas used for socioeconomic data analysis:

- **Truckee-Grass Valley Micropolitan Statistical Area (µSA).** This consists of Nevada County.
- **Sacramento-Roseville Combined Statistical Area (CSA).** This includes Sacramento, Yolo, El Dorado, Placer, Sutter, Yuba, and Nevada counties.
- **Placer County**

All three geographic areas were considered for correlation to operations at TRK, and the findings of the analysis are described in the Correlation Regression Analysis section. The 2015 AMP primarily used the Truckee-Grass Valley µSA for socioeconomic data.

VISITOR TRAVEL PROFILE

The Lake Tahoe region receives 15 million visitors per year, according to the Tahoe Regional Planning Agency facts page in 2021. The area is popular for its world-class ski resorts, outdoor recreation (e.g., fishing, biking, nature walks, etc.), golf courses, gaming casinos, dining, spas, shopping, and history. The most recent Reno-Tahoe Visitor Facts by the Nevada Commission on Tourism reported that, in 2017, 17 percent of visitors originate from Sacramento-Stockton-Modesto, 15.5 percent from Los Angeles, 13.3 from San Francisco-Oakland-San Jose, and 7.6 percent from Reno.

The greater Lake Tahoe region includes a high percentage of part-time residents and visitors. This pattern is expected to continue, but with an increasing percentage of visitors (and seasonal residents) originating from the Bay Area, Southern California, and other states. The increase in average travel distance will lead to an increase in air travel demand to the region. Although commercial airline service will accommodate primary air travel demand via Reno and Sacramento, the expectation is that demand for direct access through TRK using chartered or private airplane will increase for the same reasons that make the Lake Tahoe Region popular. Visitor lodging in the Truckee/Donner area includes about 2,240 rooms (Truckee Chamber of Commerce 2018); the Town of Truckee General Plan (GP) predicts the construction of 1,392 new rooms by 2025, an increase of 62 percent.

AREA POPULATION

Population data for the forecast is based on the Truckee-Grass Valley Micropolitan Statistical Area (µSA). The U.S. Office of Management and Budget defines a µSA as a labor market and statistical area centered on an urban area with a population of at least 10,000 but less than 50,000 people. W&P provided the Truckee-Grass Valley µSA population data.

Table 2-11 shows the historical and projected population estimates for the Truckee-Grass Valley µSA, Sacramento-Roseville combined statistical area, and Placer County for comparison. Note that the data used in this forecast was released before the 2020 Census data was released. The population projections were prepared based on annual historical data through 2018. The expectation is that the population of Truckee-Grass Valley region will increase at an average rate of 0.4 percent annually.

Table 2-11: Regional Population History and Projections

Year	µSA Population	CSA Population	Placer County
2010	98,785	2,423,484	350,629
2015	98,709	2,526,972	371,414
2020	100,557	2,668,866	400,434
2025	102,744	2,793,947	428,394
2030	104,977	2,909,797	456,935
2035	107,260	3,015,993	485,743
2040	109,592	3,108,361	511,683
CAGR '10 - '20	0.2%	1.0%	1.3%
CAGR '20 - '40	0.4%	0.8%	1.2%

Sources: W&P 2020 and California Department of Finance
CAGR: Compound Annual Growth Rate.

EMPLOYMENT AND INCOME TRENDS

Income and job data are evaluated to check for historical correlation with aviation activity. With its mountain environment, recreational opportunities, and proximity to major transportation facilities, people find the Truckee-Tahoe region a desirable place to live and work. Although mining, construction, and government employment are prevalent sectors, employment has historically been dependent upon seasonal recreation and tourism cycles. These cycles feature busier summers and winters and slower falls and springs. The cyclical trends pose a significant challenge to operating and staffing a year-round business and maintaining an employment base that can afford to live in the area. As a result, the focus of many local government and business initiatives is stabilizing the cyclical patterns by attracting non-tourist higher pay/skilled businesses to the area, enhancing the local capture of visitor spending, and increasing off-season tourism.

Table 2-12 summarizes employment, income, and housing value data from the U.S. Census for Truckee, Nevada County, and Placer County. Overall, Truckee is above state average in terms of rent, home value, and median household income. This is a potential explanation for the steadiness of aviation demand at TRK even through the impacts of COVID-19 on the industry. General aviation, business flying, and private aviation activity at TRK typically correlate with the economy, which was backed up by the 2015 Demand Drivers Study.

Table 2-12: Income a Housing Value Data

U.S. Census Region	Employment[1] (2021)	Median Household Income[2] ('15-'19)	Median Gross Rent[2] ('15-'19)	Median Owner Occupied Home Value[2] ('15-'19)
Truckee	10,180	$97,092	$1,759	$593,400
Nevada County	46,760	$66,096	$1,273	$431,000
Placer County	184,500	$89,691	$1,542	$471,500
California	16,988,700	$75,235	$1,503	$505,000

Note: Data provided in 2019 dollars.
Sources:
1 California Employment Development Department
2 U.S. Census

Virtual communication systems are altering job locations and business models. This is potentially changing the income reporting dynamic associated with the area's high volume of second homes. Recent advances in remote connectivity are enabling individuals in some job sectors to live where they want, rather than needing to live near their place of employment. This trend was in motion prior to COVID 19 and has been strengthened as many businesses were forced to adopt remote work policies in 2020. The local government is also incentivizing economic diversification. Remote working by people living in and near Truckee combined with the government's successful efforts can be expected to increase growth in non-recreation and tourist employment sectors, year-round population, and average incomes.

Additional socioeconomic data and projections for Truckee-Grass Valley µSA are supplied by W&P. Data categories analyzed include employment, earnings and income, and gross regional product (GRP). **Table 2-13** shows the top five industries by employment in Truckee-Grass Valley µSA. Healthcare is projected to become the top employer in the region by 2040. Employment in the construction and non-public administrative services sectors is also expected to grow through the forecast period.

Table 2-13: Truckee-Grass Valley µSA – Top Five Industries by Total Employees

2010		2020		2040	
Government	5.4%	Healthcare	6.6%	Healthcare	7.7%
Retail	5.2%	Government	5.9%	Government	6.3%
Healthcare	5.2%	Retail	5.8%	Construction	5.8%
Construction	4.8%	Construction	5.7%	Non-admin services	5.8%
Prof/Tech Services	4.7%	Non-admin services	5.0%	Retail	5.6%

Percentage indicates industry's share of total employment in the µSA.
Source: W&P 2020

In addition to employment, the GRP is used to analyze the economics of the region. GRP is the value of goods and services produced in a region and serves as an index for the health of the regional economy. GRP typically increases as local industries increase production of high value goods and services. **Table 2-14** shows the historical and projected GRP of the Truckee-Grass Valley µSA. From 2010 to 2020, the GRP increased an average of 1.8 percent annually. W&P forecasts project GRP to grow at an average 1.5 percent in the next 20 years.

Table 2-14: Truckee-Grass Valley µSA GRP

Year	GRP (millions of dollars[1])
2010	$4,369.41
2015	$4,653.05
2020	$5,212.13
2025	$5,687.62
2030	$6,151.69
2035	$6,611.58
2040	$7,068.73
CAGR '10 - '20	1.8%
CAGR '20 - '40	1.5%

1 Data shown in 2020 dollars.
Source: W&P 2020
CAGR: Compound Annual Growth Rate.

EDUCATIONAL PROFILE

The area's workforce is highly educated. More than 75 percent of the population in Nevada County has completed some college education, an associate degree, or higher. The regional population is highly educated compared to the state average of 62.5 percent having the same level of education. **Table 2-15** shows the comparison among educational attainment of Nevada County and Placer County and the rest of California.

Table 2-15: Educational Profile

Area	Some College or Associate Degree	Bachelor's Degree or Higher
Nevada County[1]	40.6%	36.9%
Placer County[2]	36.8%	40.0%
California[1]	28.9%	33.6%

Sources:
1 Nevada County Economic and Workforce Opportunity Profile (March 2020)
2 Placer County Department of Health and Human Services "Be Well Placer – Community Dashboard" (Jan 2021)

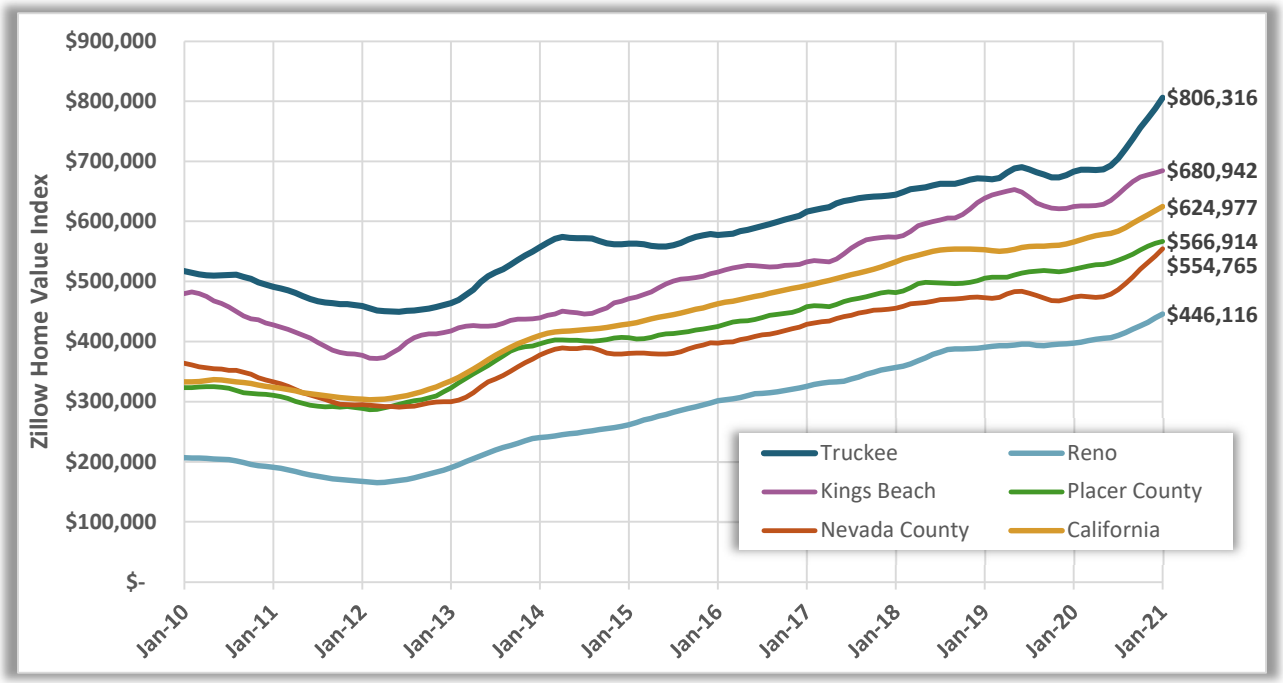
RESIDENTIAL PROPERTY VALUES

Historically, homeowners with incomes that are above the average for California and Placer County have inhabited the area. This includes homeowners who do not claim the Truckee area home as their primary residence, but rather a second home. Second-home owners travel to and from the area a variety of ways, which may include one or more of the following: personal vehicle, scheduled airlines, chartered aircraft, a corporate-owned aircraft, and personal aircraft. The establishment and growth of remote-work policies has created a boom in housing demand in the region surrounding TRK that increased during 2020 and into 2021. This high demand indicates high-income homeowners will continue to impact the housing market as more high-income individuals and families can afford to move into the area.

Figure 2-4 provides a comparison of the area home values over the past 10 years as represented by the Zillow Home Value Index. This index is based on a home valuation model to estimate a home's market value and incorporates public and user-submitted data along with location and market conditions. Looking at this data shows housing values in California have increased an average 10.5 percent between

January 2020 and January 2021. Nevada County's home values have increased 17 percent, while Placer County's increased 9 percent during the same period. The average home value in Truckee has historically been higher than the rest of the state and has risen over 18 percent in the past year.

Figure 2-4: Home Value Index by Neighborhood



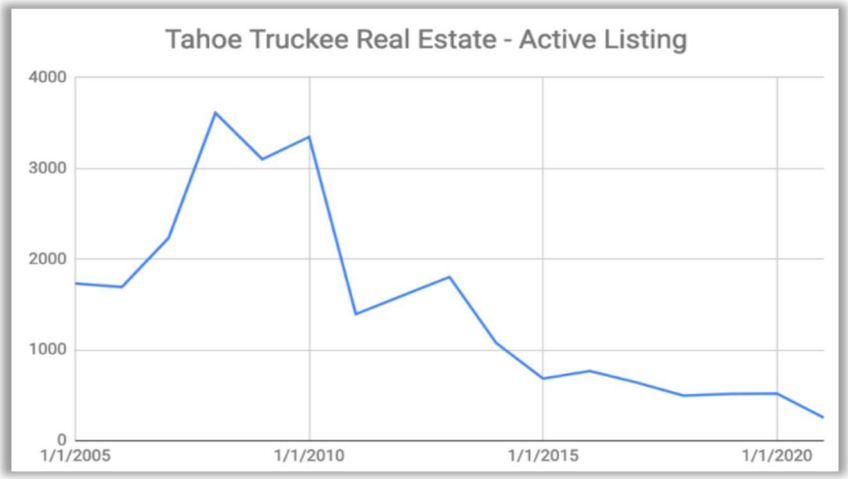
Zillow Home Value Index represents the typical value for a geographic area.
Source: Zillow, March 2021

Effects of COVID-19 Pandemic on Housing

The pandemic has created an exodus from dense, crowded urban areas to less-populated resort areas due to the perception that personal safety is greater when living in areas with lower population density. As a result, the regional housing market saw a significant increase in demand in 2020 after the onset of COVID-19. This increase is attributed to the adoption of remote-work and distance learning, allowing people to move away from urban areas. In their "2020 Year-End Market Review," Tahoe Mountain Realty reported that homes availble for immediate move-in had the highest demand. The demand for vacant land was also reported to have doubled in the past year. The demand remains steady into 2021 with residential for-sale inventory currently the lowest on record.

Figure 2-5 shows the active real estate listings in the Tahoe-Truckee area since 2005. This inventory peaked during the housing crisis of 2008 and dropped to an all time low at the end of 2020, with 252 active listings, just five weeks' supply.

Figure 2-5: Truckee-Tahoe Area Active Listings



Source: Tahoe Mountain Realty

The inventory of homes for sale helps indicate demand for housing in the region and the primary visitor market. Based on Zillow's for-sale home inventory, the number of homes available for sale in the Sacramento MSA (Sacramento, Yolo, El Dorado, Placer, Sutter, Yuba, and Nevada counties) in January 2021 is 27.3 percent lower than in January 2020. By contrast, the January 2021 San Francisco MSA's for-sale home inventory is 26.6 percent higher than one year ago. The United States average is 25.5 percent lower. **Table 2-16** shows these figures, which indicate the contrast in homes for sale in the Bay Area compared to the Truckee region.

Table 2-16: For-Sale Home Inventory

	San Francisco MSA	Sacramento MSA	United States	Truckee
January 2020	5,574	6,247	1,451,910	1,800
January 2021	7,058	4,540	1,080,975	252
Difference	26.6%	-27.3%	-25.5%	-86.0%

Source: Zillow, March 2021, Tahoe Mountain Realty

Regional Housing Devlopement

The Town of Truckee updated the Housing Element of the General Plan in 2019. The 2019-2027 Housing Element is intended to ensure that the housing needs of the community can be met. The Housing Element was updated prior to the outbreak of COVID-19 and does not reflect the ongoing housing marking boom. The update maintains the requirement to include and increase the development of affordable housing options. Table HC-4 in the Housing Element indicates that an additional 415 dwelling units are needed to meet the state mandated housing need for the 2019-2027 planning period. However, the impact of COVID-19-sparked housing demand increase on these affordable housing units is currently unknown.

The Town of Truckee has supported policies and programs that encourage housing development for low- and middle-income residents. One is the Accessory Dwelling Unit Pilot Program, which looks to

grow the inventory of long-term rental homes available for local workers within existing neighborhoods. Another is the Long-Term Rental Grant Program that incentivizes homeowners to shift from short-term rentals to a 12-month leases for locally employed tenants. The Town of Truckee is also actively evaluating various areas with the possibility of rezoning to accelerate residential development.

Multiple housing developments are currently under construction in the Town of Truckee. One is the Truckee Artist Lofts project, which is part of the mixed use and mixed income Railyard Master Plan Area. Another is the Frishman Hollow, a four-building, 68-unit affordable housing project. Last is the 48-unit Coldstream Commons. Additional residential projects are at various stages of being approved.

The Mountain Housing Council is a cooperative project that provides solutions to affordable housing in the North Tahoe-Truckee region through availability, variety, and affordability. Other projects located in the North Tahoe-Truckee region associated with Mountain Housing Council are the Pacific Crest Commons, Meadow View Place, Soaring Ranch, Dollar Creek Crossing, and Coburn Crossing developments.

OTHER DEVELOPMENT

Various local efforts are underway to incentivize commercial and light industrial development. The Truckee General Plan also predicts a significant increase in square footage for non-residential development within its defined planning area. Non-residential development was inventoried in 2005 to be 2.8 million square feet. It is expected to average 2.4 percent growth annually (to 5 million square feet by 2025). **Table 2-17** shows totals for each development type**.** Specific non-tourism related employment sectors being targeted for development include healthcare related industries and "new-economy" businesses, such as high-tech and information-based businesses.

Table 2-17: 2025 General Plan Non-Residential Build-out Projections

Development Type	2025 Square Feet
Commercial	1,994,000
Office	952,000
Light Industrial / Warehouse	1,259,000
Religious	85,700
Lodging	700,000 (1,392 rooms)
Total Square Feet	5,000,000

Source: Town of Truckee 2025 General Plan, Table I-3

Regional Analysis Summary

Regional socioeconomic factors help drive activity at TRK. The Truckee-Tahoe region is popular with tourists, and the area becomes more popular each year. Population in Nevada County is expected to grow at 0.4 percent, and in Placer County, at 1.2 percent through 2040. Home values and median income in the region are above the California average. Home prices and housing demand have also spiked in 2020 due to COVID-19 and more people permanently relocating to the area. The increase in demand for homes in the area – either by permanent or seasonal homeowners – will continue to drive up home prices unless supply is increased beyond what is currently planned and in development. This socioeconomic data will be analyzed to determine if there is strong correlation between these variables and aircraft activity at TRK. If the correlation is strong, then regression analysis may be utilized to forecast future operations.

Airport Role

The FAA NPIAS classifies TRK as a general aviation airport, and the airport is designated as a regional general aviation airport by California Division of Aeronautics. The airport provides transportation access for residents and visitors to the Truckee-Tahoe region. Airport users include recreational pilots, business aviation, flight training, emergency services, and air taxis. Commercial operations are limited to non-scheduled air taxi flights that carry fewer than 10 passengers. There are no scheduled commercial airline operations. These aviation-related service providers are located at TRK:

- **Care Flight**
- **Mountain Lion Aviation**
- **Sierra Aero**
- **Civil Air Patrol**
- **Experimental Aircraft Association**
- **Skydive Truckee Tahoe**
- **Soar Truckee**
- **Tahoe Flying Club**

TRK will focus on acknowledging national trends but is subject to limitations in accordance with community expectations and noise and annoyance impacts. A wide range of aircraft types use the airport including helicopters, single- and multi-engine propeller aircraft, turboprops, business jets, and gliders. Most operations are by light piston aircraft. However, TRK has experienced a shift in operations from piston aircraft to turboprop and business jet aircraft in line with national trends as these aircraft have gained a greater share of the national fleet mix. This trend of a greater share of turboprops and jet aircraft in the national system is expected to continue.

The TTAD operates its facility as a Community Airport. In doing so, the TTAD engages and actively seeks opportunities to support local initiatives and to provide facilities that can be used for community and/or joint aviation-community purposes. Initiatives include open-space preservation, sponsoring educational programs and youth activities, and hosting aviation-related family events. Additionally, TTAD has undertaken several initiatives to reduce off-airport annoyance, enhance aviation-community trust, and enhance safety. Facilities that benefit the general public include an on-airport restaurant, picnic areas, children's park, makerspace, a food hub, community house, and emergency helipad sites. Public meeting space available at TRK is being used by groups such as the Girl Scouts, American Youth Soccer, Chamber of Commerces, and Toastmasters.

TTAD Statement:

As a **"Community Airport"** the TTAD does not currently seek to encourage: all-weather operational capability, nighttime aircraft activity, scheduled commercial flight operations, nor operations by aircraft larger than the ones presently using the Airport.

The role of the airport is not expected to change over the planning period. It is expected that activity at TRK will increase comparable with the overall growth of the community and that the mix of aircraft types using the airport will change incrementally over time. This is expected to be consistent with broad-scale changes affecting the U.S. general aviation industry, specifically with a greater share in operations by turboprops and small business jets.

AIRPORT SERVICE AREA

This Airport Service Area (**Figure 2-6**) is defined by a driving time to the airport of one hour or less in good weather conditions (i.e., locations within 50 miles of TRK). Also shown are other nearby airports. Most are classified as general aviation airports that service similar aircraft types as those using TRK. **Table 2-18** highlights major features of these airports and their distance from TRK.

Figure 2-6: Airport Service Area

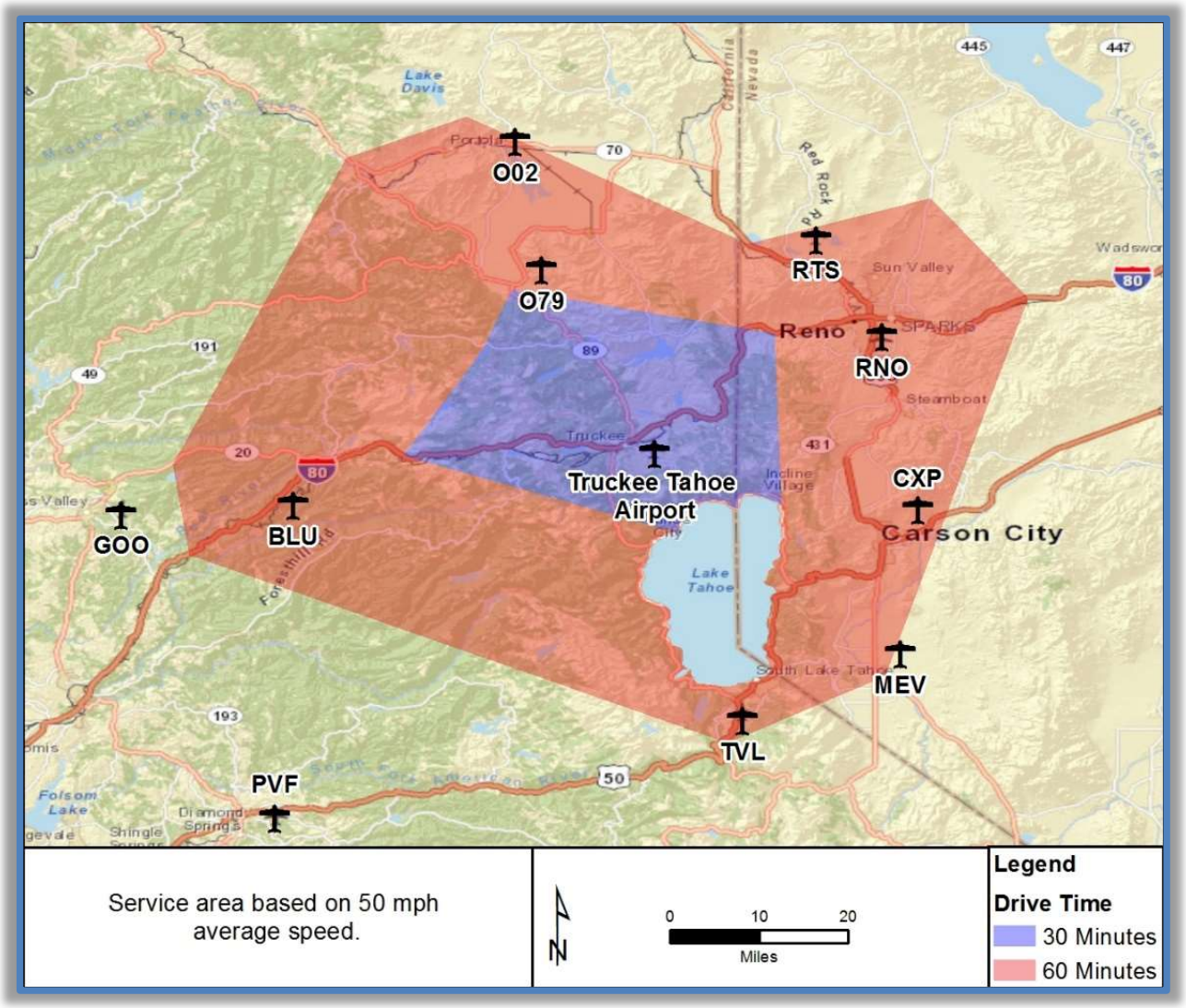


Table 2-18: Area Airports

Airport		Distance from TRK (NM)	Runways (Longest in feet)	Major Facilities
RNO	**Reno Tahoe International**	20 NE	3 (11,002)	▪ Air carrier services and passenger terminal ▪ Customs landing rights airport ▪ Fuel – 100LL and Jet A1+ ▪ Hangars and tie-downs for parking ▪ Airframe and powerplant service. ▪ Deicing facilities
CXP	**Carson City**	20 E	1 (6,100)	▪ Fuel – 100LL and Jet A ▪ Hangars and tiedowns for parking ▪ Airframe and powerplant service.
O79	**Sierraville – Dearwater**	20 NW	1 (3,260)	▪ Tiedowns
RTS	**Reno – Stead**	24 NE	2 (9,000)	▪ Fuel – 100LL and Jet A ▪ Tie-downs for parking ▪ Airframe and powerplant service.
MEV	**Minden – Tahoe**	26 SE	3 (7,400)	▪ Fuel – 100LL and Jet A ▪ Hangars and tie-downs for parking Airframe and powerplant service.
TVL	**South Lake Tahoe**	26 S	1 (8,544)	▪ Fuel – 100LL and Jet A
BLU	**Blue Canyon – Nyack**	27 W	1 (3,300)	▪ Tiedowns
O02	**Nervino Beckwourth**	31 N	1 (3,260)	▪ Fuel – 100LL ▪ Tie-downs for parking
GOO	**Grass Valley**	46 W	1 (4,351)	▪ Fuel – 100LL and Jet A ▪ Tie-downs for parking ▪ Airframe and powerplant service.
PVF	**Placerville**	53 SW	1 (3,910)	▪ Fuel – 100LL and Jet A ▪ Tie-downs for parking ▪ Airframe and powerplant service.

Source: Airnav.com

Demand Influences

Aviation activity at TRK is influenced by a unique combination of market demand, policy restrictions, and facility constraints. This section describes the influence that each has on existing and future demand to be accommodated at TRK.

MARKET DEMAND

Truckee has been and will continue to be a desired location for permanent residents, tourists, and seasonal residents. The airport's activity will likely reflect the changing socioeconomic profile discussed in previous sections, likely increasing proportionally and experiencing a gradual flattening of the high/low activity cycles.

Continued socioeconomic growth of the area will likely result in additional demand for based aircraft, particularly turboprops and jets, and increased operations by these aircraft types, the combination of which could include based aircraft flights by the owner and chartered transient operations. The FAA ASF projects that turboprop and jet aircraft will increase at a higher rate than piston aircraft throughout the planning period. This trend is also anticipated to occur locally as the number of multi-engine and jet aircraft based at the Airport are expected to increase at a higher growth rate than single-engine, piston aircraft.

2015 Demand Drivers Study

The 2015 Demand Drivers Study examined which aviation and non-aviation variables correlate to aviation activity demand at TRK. The key findings were that two major factors influence demand at TRK, and these are outside of the Airport's control: the location of the Airport and its relation to the Truckee - Tahoe Area, and the economic health of the nation and region. The Study also found:

- TRK is not the primary demand driver in the local area but is instead responding to it.
- TRK sees less traffic than nearby airports studied, and aviation activity in the region is not spread evenly across the airports.

The Demand Driver Study included a survey of tenants and pilots who operate at TRK with these being some of the findings:

- The location of an airport is a significant driver in demand.
- Changes to pricing and service availability are possible that could make users more or less likely to use TRK.
- Facilities that TRK could add that may grow traffic include better instrument procedures, aircraft deicing services or availability of a hangar for deicing, and cheaper fuel.
- A portion of current users of TRK will operate here, even when their preferred type of aircraft storage is not available.

Hangar Waitlist

TRK manages two hangar waitlists, one for aircraft that typically base in a T-hangar, and another list for executive aircraft that are stored in a larger box hangar. This is the waitlist inventory as of May 2021:

- **96 total aircraft on the T-hangar waitlist**
  - The most popular aircraft on this waitlist is the Cessna (172 up to 340) with 21 applications.
  - The second most popular aircraft on this waitlist is the Cirrus SR22, with nine applications.
- **39 total aircraft in the executive hangar waitlist**
  - The most popular aircraft on this waitlist is the PC-12/24, with nine applications.

The waitlist shows strong demand and indicates that if TRK were to build hangars, these would be immediately filled. Executive hangar rows N and P were constructed in 2019, and these were filled by aircraft from the executive hangar waitlist.

TTAD VOLUNTARY PROGRAMS

TRK operates as a Community Airport that places emphasis on influencing off-airport visual, noise, and impacts associated with overflights, takeoffs, and landings. Several volunteer incentives to dissuade nighttime operations and programs are in place to communicate these incentives with transient operators.

TRK experiences limited nighttime operations. TTAD is committed to monitoring potential increases in nighttime activity that may result from increased use of advanced aircraft systems and performance. The Airport has promoted a voluntary No Fly Curfew from 10 p.m. to 7 a.m. to help support the Airport's Good Neighbor policy. TRK also promotes a Fly Quiet program to limit nighttime operations by contractual agreement with tenants to fly and not fly during specific nighttime hours. This is done by offering a reduced hangar rental rate incentive in exchange for these tenants to not depart or arrive at TRK between late evening and early morning. Two programs are in place offering different incentives, and operations are tracked by the Vector system.

TRK management has recorded night operations over the past 10 years. The airport averages about 10 night operations per month and estimates that four of these are EMS operations. These night operations typically occur near the curfew hours of 10 p.m. and 7 a.m. TRK staff indicated that the number of night operations has remained consistent over the past 10 years, and staff does not anticipate significant changes to the frequency of night operations. One indicator for this is, while technology in aircraft has improved nighttime performance, night operations at TRK have remained relatively unchanged. TRK is also surrounded by terrain that limits instrument flight procedure development, which in turn limits operations at night.

FACILITY CONSTRAINTS

TRK currently receives infrequent operations by the largest airplanes in the general aviation fleet. These operations can be accommodated with the existing facilities. Because the higher end business jet market desires access to smaller airports such as TRK, there is a marketplace incentive for airplane purchasers and manufacturers to moderate the physical size of the aircraft.

Airside facilities such as the runways and taxiways do not impose significant constraints to airport utilization. The runways are long enough to accommodate the aircraft that typically operate at TRK, and the pavement strength is sufficient as well. However, for airfield pavements to accommodate regular use by airline or airliner-type business jets, the pavement would require strengthening.

TRK's primary constraints are the lack of hangar availability, which constitutes a constraint on natural demand that would otherwise be in place today. Additional operational activity is possible if more hangars were available to house more aircraft. However, in some cases the demand for larger aircraft is from current operators of smaller, piston aircraft. In this case, larger aircraft would replace the smaller piston aircraft and result in a small or no change in total operations. Additionally, the Demand Drivers Study showed that based aircraft are not the primary driver of activity, with about 75 percent of operations at the Airport conducted by aircraft not based at TRK.

The natural setting of TRK presents other constraints due to the natural environment of the High Sierras and its location within Martis Valley. The location creates a bowl-like setting and airspace challenges. Flight procedure development is limited by the terrain, with high approach minimums that essentially provide for a descent through a cloud layer and for landing in semi-visual conditions (more than 1-mile visibility).

TRK does not have a deicing facility that would enable continued operations during a winter storm. The combination of high approach minimums and lack of deicing likely contributes to a portion of planned flights diverting to another airport or cancelling a trip. Other operators, such as air charter operators, may conduct additional drop off/pick up operations or reposition to other airports. In these cases, the operator is avoiding snow/ice accumulation during day-long or overnight stopovers.

CORRELATION AND REGRESSION ANALYSIS

Correlation is the strength of the relationship between two variables' rate of change. The stronger the correlation, the more linear their relationship is – a positive correlation means two variables increase together while a negative correlation means one variable declines, while the other increases. The stronger the positive correlation, the closer the correlation coefficient approaches the value of 1.0. Strong negative correlations are closer to -1.0 while having no correlation equals a coefficient of 0. For the purposes of analysis, a coefficient greater than 0.8 is considered strongly correlated.

This analysis showed that regional socioeconomics have a strong correlation with TRK operations. The five variables with the highest correlation with TRK operations are Truckee-Grass Valley's population, employment, total retail sales, income per capita, and GRP. **Table 2-19** shows the correlation coefficients of each socioeconomic variable against total annual operations and turbine (jet and turboprop only) operations at TRK.

Table 2-19: TRK Total Annual Operations Correlation Analysis (2009-2019)

Correlation Coefficient	Total Annual Operations	Turbine Operations[1]
Population	0.85	0.76
Employment	0.96	0.97
Total Retail Sales	0.97	0.95
Income Per Capita	0.97	0.96
GRP	0.99	0.94

1 Turbine operations include jet and turboprop operations.
Sources: Mead & Hunt, TRK Airport records, W&P 2020

Based on the correlation analysis, all the socioeconomic variables examined have a relatively strong relationship with the total annual operations at TRK, with GRP having the strongest correlation with a 0.99 coefficient. Similarly, turbine operations have strong relationships with most of the socioeconomic variables. However, the correlation between population and turbine operations falls below the 0.8 threshold and is considered to not be strongly correlated.

These variables were then analyzed against total annual operations and turbine (jet and turboprop only) operations at TRK. The validity of each equation is measured by the R-square value. The R-square value describes how well the regression equation replicates the historical observed outcomes. The closer the R-squared value is to 1.00, the more confidence can be placed in the equation's ability to explain historical variability rather than occurring by chance.

To account for the effects of the different but strongly correlated variables, multi-variable regression models were tested against historical operations. Multi-variable models allow the forecast to account for different factors such as population data and economic forces such as GRP or income in one model. In the case of multi-variable regression, the adjusted R-square is used to decide the level of confidence each model has. The adjusted R-square is needed because every additional variable added to a model increases the R-square, never decreasing it, which can lead to a deceptively high R-square value. The adjusted R-square value accounts for this effect and avoids the issue of not knowing if the R-square value is high due to having a better model or because more predictor variables are present. The multi-variable regression uses the following linear model:

$$y = m_1(x_1) + m_2(x_2) + m_3(x_4) + \ldots + b$$

Where:

y	Represents the forecasted number
m	Represents the predictor variables
x	Represents the regression coefficients
b	Represents the intercept or what y would equal when all predictor variables equal zero

All three geographic areas (Truckee-Grass Valley µSA, Sacramento-Roseville CSA, and Placer County) were considered for correlation to operations at TRK. All three areas have strong correlation between socioeconomic data and historical operations. The µSA was found to have the best correlation with activity at TRK. Placer County and the CSA also correlated strongly, but the µSA profile was found to fit the TTAD profile: this area is a better representation of the TTAD population and economies. The CSA and Placer County were found to have influencers outside the typical makeup of the TTAD, specifically the Sacramento metro area.

Aircraft Operations Forecast

The historical period examined for the operations forecast includes calendar years 2009 to 2019. Calendar year time frame is used to report historical data to match TRK's annual reports based on the the airport's more detailed daily data collected with the Vector Airport Systems until 2015. The detailed daily data was used when possible to determine the total FY operations to make more accurate comparisons with FAA data, which is provided in FY.

Data for CY and FY 2020 is included in the historical range, but the operations data for 2020 is excluded when calculating future operations as 2020 is considered an outlier due to COVID-19. Thus, 2019 is used as a base year for calculations. However, the recovery from COVID-19 is important for the near-range forecast and is specially accounted for in all forecast methodologies.

ACCOUNTING FOR COVID-19 IMPACTS

The forecasts were developed during the COVID-19 pandemic. Impacts of COVID-19 to operations in the general aviation industry have differed from commercial operators and airports. This section addresses specific impacts to TRK in 2020 and a model for TRK returning to 2019 operation levels.

There is confidence that operations at TRK will return to annual 2019 levels in the near term due to factors discussed in the Introduction, particularly where the effects of COVID-19 were discussed. The FAA Air Traffic Activity System reported that, nationwide, general aviation activity returned to pre-COVID-19 activity levels in December 2020. The appeal of the Truckee-Tahoe area as a permanent residence or part-time destination is also a primary driver for recovery as discussed in the Regional Analysis section.

According to airport records, TRK operations dropped 11.1 percent between 2019 to 2020. For context, annual operations between 2018 and 2019 increased 3.8 percent while the five-year Compound Annual Growth Rate (CAGR) from 2015 to 2019 was 11.6 percent. This 11.1 percent decrease in total operations saw TRK's operations fall to 2017 levels during the height of the pandemic. However, as quickly as operations fell, levels returned to pre-COVID-19 levels in September 2020.

Based on recent (five-year) growth and the strong correlations TRK operations have with regional socioeconomic indicators, the model for these forecasts assumes that operations will return to 2019 levels in 2021. This is reinforced by vaccine rollout and the general opening of facilities, coupled with growth in region and the lack of residents returning to primary homes.

Forecast methods described in the following section assume, for the most part, operations of each aircraft type and/or total operations will be set to be at or below 2019 levels. This process involves:

- Projecting 2021 operations by aircraft type with FAA ASF growth rate or regression analysis growth rate using 2019 as the base year. Each aircraft type is considered individually, and some forecast methods used will have exceptions to this process.
    - If the 2021 operations for each aircraft type is greater than that of 2019, 2021 operations are adjusted to be equal to 2019.
    - If 2021 operations are not greater than that of 2019, the forecast is kept as-is.
- Adjusting the base year for calculations for 2022 onward to 2040.

The use of 2021 as the base year for calculations to project operations from 2022 onward is to have the projections based on post-COVID recovery. Using 2019 as the base year for projections would ignore the impacts of 2020, which is an outlier year due to COVID-19 impacts.

Facility design and implementation should be completed as demand dictates. Given the uncertainty related to COVID-19, and its potential sustained impact to aviation activity, a future evaluation of the forecast data may be necessary depending on the timeline for facility implementation.

OPERATIONS FORECAST METHODOLOGIES

Forecast methodologies consider FAA developed forecasts, correlation with socioeconomic variables, comparison to peer airports, and historical trends. The total operation methods are presented first. Forecasts for itinerant and air taxi operations are then presented as derivatives of this overall forecast.

2019 TAF Rate

The 2019 TAF Rate method considers the FAA TAF projection for TRK and applies this growth rate to the base year. The TAF forecast has growth rate set at 0 percent growth at TRK, as this general forecast expects no growth or decline in operations at TRK. This method projects operations will remain constant for the forecast period. The TAF Rate method is shown in **Table 2-20.**

Table 2-20: 2019 TAF Rate Operations Forecast

Fiscal Year	2019 TAF	TAF Rate Forecast
2019	35,000	39,621
2020	35,000	35,203
2021	35,000	39,621
2025	35,000	39,621
2030	35,000	39,621
2035	35,000	39,621
2040	35,000	39,621
'19 - '40 CAGR	0.0%	0.0%

Sources: Mead & Hunt, TRK Airport records, FAA TAF
CAGR: Compound Annual Growth Rate.

The 2019 TAF Rate forecast method is not preferred as it does not reflect the changes in operations and fleet mix that have occurred in the past 10 years. The growth in operations TRK has experienced in the past and the strong socioeconomic outlook for the region point to recovery and growth in operations post-COVID-19 impacts. Therefore, the TAF rate forecast is not recommended to be a preferred forecast for TRK operations.

Total Operations Regression

The Total Operations Regression forecast method examines the relationship between historical trends and multi-variable relationships to project operations at TRK. This method first projects the future total annual operations using regression, then calculates individual aircraft type operations using a combination of the FAA ASF growth rates for all aircraft types except single-engine piston operations. Single-engine piston operations are calculated as 100 percent of annual operations minus operations of

all other aircraft types. **Table 2-21** shows the top five most highly correlated socioeconomic variables with regards to total annual operations at TRK.

Table 2-21: 2009-2019 Total Operations Correlation Analysis

Correlation Analysis (2009-2019)	Correlation Coefficient
Population	0.851
Employment	0.962
Total Retail Sales	0.970
Income Per Capita	0.967
GRP	0.986

Sources: Mead & Hunt, TRK Airport records, W&P 2020

Similar to the correlation coefficient, adjusted R-squared values closer to 1.0 or -1.0 indicate a strong relationship. Different combinations of these variables were put through regression analysis with two two-variable combinations having the highest adjusted R-square at 0.972. **Table 2-22** shows the top three adjusted R-square values of the different multi-variable combinations tested.

Table 2-22: Total Operations Multi-Variable Regression Comparison

Variables	Adjusted R Square
Population + GRP	0.972
GRP + Income Per Capita	0.972
GRP + Employment + Income Per Capita	0.969

Sources: Mead & Hunt, TRK Airport records, W&P 2020

The multi-variable regression model selected uses the Truckee-Grass Valley population and GRP variables as it has the highest adjusted R-square and includes representation of both demographics and economics in the model compared to the more economics-focused GRP and income combination. Thus, the linear multi-variable regression model equation is as follows:

Total Annual Operations Regression Equation:

$$y = m_1(x_1) + m_2(x_2) + b$$

y = Total Annual Operations

b = Intercept from Regression Analysis

$$y = (-1.93 \times Population) + (26.97 \times GRP) - 96030.73$$

This equation is used to calculate the total annual operations at TRK for each forecast year. Operations by individual aircraft type are then determined by aircraft type specific growth rates or percentages. All aircraft types outside of single-engine piston operations are determined using the FAA ASF's growth rates with 2021 as the base year for calculations. This includes turbine aircraft (turboprops and all jet types), helicopter, multi-engine piston, glider, and glider tow plane operations.

Single-engine piston operations are calculated by determining the percentage of total annual operations by the other aircraft types. The remainder of the total operations would therefore equal the number of single-engine piston operations. **Table 2-23** shows the historical percentages based on airport records.

Table 2-23: Historical Percentage of Annual Operations by Aircraft Type

Aircraft Type	2015	2016	2017	2018	2019	2020
Piston	35.9%	40.3%	41.0%	41.9%	42.2%	46.4%
Piston T&G[1]	7.2%	8.1%	8.2%	8.4%	8.4%	9.3%
Piston Twin	5.1%	3.4%	3.1%	3.1%	3.2%	3.1%
Turboprop	19.3%	18.1%	19.0%	18.0%	16.0%	14.9%
Jet 2 (< 12.5k lbs)	3.1%	2.6%	2.6%	2.4%	2.5%	2.4%
Jet 3 (12.5-20k lbs)	4.3%	3.8%	4.4%	4.6%	4.2%	5.0%
Jet 4 (20 - 50k lbs)	3.3%	3.3%	3.5%	4.2%	3.8%	5.1%
Jet 5 (50k+ lbs)	0.8%	0.7%	0.8%	0.8%	0.7%	1.1%
Helo	3.8%	3.4%	3.4%	2.7%	2.5%	2.1%
Gliders Only	8.6%	8.2%	7.0%	7.0%	8.3%	5.4%
Glider Tow Plane[2]	8.6%	8.2%	7.0%	7.0%	8.3%	5.4%

1 T&G: Touch-and-go operations. Historically calculated as 20 percent of piston operations, based on formula derived by TRK staff.
2 A glider tow plane is a single-engine piston aircraft but separated into a its own category to match TRK reporting preferences.
Source: TRK Airport records.

Historically, single-engine touch-and-go (Piston T&G in the table) are equal to 20 percent of single-engine piston operations. This formula was developed during the 2015 AMP, and this formula has been carried forward by TRK staff to estimate touch-and-go data. The Vector system is not able to accurately record touch-and-go operations due to the aircraft not triggering the cameras used to track operations when they land and takeoff.

TRK staff have indicated this 20 percent estimation may be low. There are two reasons for this: training activity has increased at TRK since the 2015 AMP, and the air traffic control tower staff have direct observed touch-and-go activity. Air traffic control tower staff and training operators were asked about this formula and provided input. TRK staff indicated that touch-and-go operations are closer to 35 percent of single-engine piston operations and recommended that this figure be used for forecasts.

The forecast using this method is “back-calculated” by determining total operations through the following steps:

1. Total annual operations are calculated via multi-variable regression.
2. Multi-engine piston, turboprop, jet, helicopter, and glider operations are forecasted using the FAA ASF growth rates.
3. The annual total single-engine operations number is the difference between total annual operations and the sum of the operations of the other aircraft types.
4. Single-engine piston touch-and-go operations are equal to 20 percent of single-engine piston operations in 2021. This percentage increases to 35 percent of piston operations in 2022 and is expected to remain at 35 percent through the forecast period.

Table 2-24 shows the forecasted operations by aircraft type using the total operations regression method. This method forecasts operations to nearly double from 2019 operations to over 78,000 operations by 2040.

Table 2-24: Total Operations Regression Method Forecast

Aircraft Type	2019	2020	2021	2025	2030	2035	2040	'21-'40 CAGR
Piston	16,618	16,327	17,778	19,502	24,991	31,615	39,596	4.3%
Piston T&G[1]	3,324	3,265	3,556	6,826	8,747	11,065	13,859	7.4%
Piston Twin	1,183	1,089	1,172	1,151	1,125	1,099	1,075	-0.5%
Turboprop	6,469	5,234	6,469	6,775	7,178	7,606	8,058	1.2%
Jet 2 (< 12.5k lbs)	1,011	835	1,011	1,103	1,231	1,373	1,532	2.2%
Jet 3 (12.5-20k lbs)	1,652	1,755	1,652	1,803	2,011	2,244	2,503	2.2%
Jet 4 (20 - 50k lbs)	1,548	1,805	1,548	1,690	1,885	2,103	2,346	2.2%
Jet 5 (50k+ lbs)	294	374	294	321	358	399	446	2.2%
Helicopters	948	747	948	1,011	1,097	1,189	1,290	1.6%
Gliders Only	3,287	1,886	3,287	3,427	3,611	3,805	4,010	1.1%
Glider Tow Plane[2]	3,287	1,886	3,287	3,427	3,611	3,805	4,010	1.1%
TOTAL	**39,621**	**35,203**	**41,002**	**47,037**	**55,846**	**66,305**	**78,723**	**3.5%**

1 T&G: Touch-and-go operations calculated as 35 percent of piston operations, based on formula derived by TRK staff.
2 A glider tow plane is a single-engine piston aircraft but is separated into its own category to match TRK reporting preferences.
Source: Mead & Hunt and TRK Airport records
CAGR: Compound Annual Growth Rate.

Turbine Regression

Similar to the Total Operations Regression method, the Turbine Regression method, uses correlation analysis to forecast operations. This method is also based on the strong multi-variable correlation (adjusted r-square being greater than 0.8) between historical jet and turboprop operations with Truckee-Grass Valley socioeconomics.

Table 2-25 shows the top five most highly correlated socioeconomic variables with regards to annual turbine operations at TRK. In the case of turbine operations, population was found to have a correlation coefficient of 0.76, which would be considered "moderately" correlated with turbine operations while the other variables were found to be strongly correlated.

Table 2-25: 2009-2019 Turbine Operations Correlation Analysis

Correlation Analysis (2009-2019)	Correlation Coefficient
Population	0.76
Employment	0.97
Total Retail Sales	0.95
Income Per Capita	0.96
GRP	0.94

Sources: Mead & Hunt, TRK Airport records, W&P 2020

Table 2-26 shows the three of the adjusted R-square values of the different multi-variable combinations considered.

Table 2-26: Turbine Operations Multi-Variable Regression Comparison

Variables	Adjusted R Square
Employment + Income Per Capita	0.934
GRP + Income Per Capita	0.909
Employment + Income Per Capita + Retail Sales	0.937

Sources: Mead & Hunt, TRK Airport records, W&P 2020

The GRP and income per capita two-variable model was selected for the turbine regression forecast due to the historical relationship between high GRP, income, and likelihood of using private and chartered jets for business and leisure travel. Employment and retail sales are also strongly correlated but income represents a more individual factor for the section of the population that may choose to travel by jet from TRK. Employment and retail sales cover broader factors as not all people employed in the Truckee-Grass Valley area have high-income employment, and retail sales may include visitors to the area making purchases.

Total Annual Operations Regression Equation:

$$y = m_1(x_1) + m_2(x_2) + b$$

y = Total Turbine (Jets + Turboprops) Operations

b = Intercept from Regression Analysis

$$y = (0.46 \times Population) + (2.36 \times GRP) - 30353.20$$

Rather than project the total annual operations with the regression formula, the Turbine Regression method only calculates the future operations by jets and turboprops. The jets and turboprop operations are referred to as "turbine" operations. The turbine operations are forecasted individually as they are the fastest growing aircraft category at TRK with overall jet operations having increased 11 percent between 2009 and 2019 and turboprop operations increasing 8 percent during the same period. Factors detailed in the Regional Analysis and Demand Influences sections back up the demand for turbine aircraft at TRK. The operations by other aircraft types are based on the ASF 2020-2040 growth rates.

Turbine Regression method follows these steps:

1. Total turbine annual operations are calculated via multi-variable regression based the 5-year historic trend for turbine aircraft operations.
2. Each turbine aircraft type (turboprop, Jet 1, 2, etc.) is forecasted using the historic turbine fleet operations percentage. The forecasted operations percentage for all turbine aircraft except for Jet 4 (MTOW 20,000 to 50,000 pounds) use the FAA ASF CAGR of 1.2 percent for turboprops and 2 percent for jets. Jet 4's operations percentage is then determined by subtracting the other turbine aircraft's percentages from 100 percent.

$$\textbf{\textit{Jet 4 operations}}\ \% = 100\% - (\textbf{\textit{Turboprop}}\ \% + \textbf{\textit{Jet 1}}\ \% + \textbf{\textit{Jet 2}}\ \% + \textbf{\textit{Jet 3}}\ \% + \textbf{\textit{Jet 4}}\ \%)$$

3. Multi-engine piston, helicopter, and glider operations are then individually forecasted using the FAA ASF growth rates.
4. Single-engine piston operations are expected to remain relatively steady at a CAGR of 0.25% into the forecast period.
5. Single engine piston touch-and-go operations are equal to 20 percent of single engine piston operations in 2021. This percentage increases to 35 percent of piston operations in 2022 and is expected to remain at 35 percent through the forecast period.

Jet 4 have been the fastest growing segment of turbine operations with average 7.3 percent increase annually for the past 5 years. This growth rate is unlikely to be a sustainable level of growth for the 20-year forecast period. Thus, the Jet 4 operations make up the remainder of operations after subtracting the percentages of the other aircraft types (100% - [turbine operations – Jet 4]).

Additionally, this method incorporates a positive piston CAGR of 0.25 percent rather than the one percent average annual decrease the FAA ASF projects for single-engine piston aircraft. This difference is due to the waitlist TRK has for Cirrus aircraft which will replace older single-engine piston aircraft. Thus, while single-engine piston aircraft are expected to decline nationally, the popularity of Cirrus on the TRK waitlist indicates a stable local single-engine piston market. This, along with TRK-based businesses operating at TRK that use Cirrus aircraft merits the 0.25 percent CAGR for single-piston aircraft operations. **Table 2-27** shows the 2020-2040 CAGR used for each aircraft type for this forecast method.

Table 2-27: 2020-2040 Growth Rates by Aircraft Type - Turbine Regression Method

Aircraft Type	2020-2040 CAGR
Single-Engine Piston[1]	0.25%
Multi-Engine Piston[2]	-0.46%
Jet[2]	1.16%
Turboprop[2]	2.21%
Helicopter[2]	1.82%
Other[2]*	1.63%

1 Flat growth rate
2 FAA Aerospace Forecast 2020-2040
*The 'Other' aircraft type in this analysis uses the TAF classification which is derived from the sum of ASF's Experimental, Sport Aircraft, and Other aircraft.
Source: Mead & Hunt and FAA ASF
CAGR: Compound Annual Growth Rate.

Table 2-28 shows the breakdown of the Turbine Regression Method forecast by aircraft type.

Table 2-28: Turbine Regression Method Forecast

Aircraft Type	2019	2020	2021	2025	2030	2035	2040	'21-'40 CAGR
Piston	16,618	16,327	16,618	16,785	16,996	17,209	17,425	0.3%
Piston T&G[1]	3,324	3,265	3,324	5,875	5,948	6,023	6,099	3.2%
Piston Twin	1,183	1,089	1,172	1,151	1,125	1,099	1,075	-0.5%
Turboprop	6,469	5,234	6,810	7,586	8,682	9,936	11,370	2.7%
Jet 2 (<12.5k lbs)	1,011	835	1,112	1,362	1,840	2,487	3,360	6.0%
Jet 3 (12.5-20k lbs)	1,652	1,755	1,818	2,226	3,007	4,063	5,491	6.0%
Jet 4 (20-50k lbs)	1,548	1,805	2,011	2,261	2,668	3,036	3,298	2.6%
Jet 5 (>50k lbs)	294	374	323	396	535	723	977	6.0%
Helicopters	948	747	948	1,011	1,097	1,189	1,290	1.6%
Gliders Only	3,287	1,886	3,287	3,427	3,611	3,805	4,010	1.1%
Glider Tow Plane[2]	3,287	1,886	3,287	3,427	3,611	3,805	4,010	1.1%
TOTAL	**39,621**	**35,203**	**40,710**	**45,508**	**49,122**	**53,377**	**58,404**	**1.9%**

1 T&G: Touch-and-go operations calculated as 35 percent of piston operations, based on formula derived by TRK staff.
2 A glider tow plane is a single-engine piston aircraft but separated into a separate category to match TRK reporting preferences.
Source: Mead & Hunt and TRK Airport records
CAGR: Compound Annual Growth Rate.

Peer Airport Forecast

The Peer Airport method examines airports with similar demand and characteristics as TRK. The peer airports selected for this analysis are near resort destination areas, set in mountainous terrain, and where general aviation and charter operations dominate. All peer airports, except TVL, accommodate Part 139 commercial operations, but these operations are a small fraction of total operations. General aviation operations dominate at each of these airports, with significant air taxi and charter service. The peer airports are:

- **ASE – Aspen, CO**
- **EGE – Eagle / Vail, CO**
- **JAC – Jackson Hole, WY**
- **SUN – Sun Valley, ID**
- **TEX – Telluride, CO**
- **TVL – South Lake Tahoe, CA**

The data for the peer airport is sourced from the FAA's Traffic Flow Management System Counts (TFMSC). This data captures operations with filed flights plan and/or when flights are detected by the National Airspace System. However, this data is not comprehensive as it does not contain information for operations without filed flight plans or cancel plans before landing. Thus, only jet and turboprop operations data were used in the quantitative analysis of peer airports. The peer airport turbine growth rates are shown in **Table 2-29**.

Table 2-29: Peer Airport Turbine Compound Annual Growth Rates

CAGR (Fiscal Year)	ASE	EGE	JAC	SUN	TEX	TVL	Average
2009-2019	1.6%	3.8%	2.6%	-0.6%	7.4%	2.0%	2.8%
2015-2019	3.7%	3.1%	4.4%	-1.1%	2.4%	1.5%	2.3%

Source: TFMSC
CAGR: Compound Annual Growth Rate.

For the operations forecast, the 10-year 2009-2019 CAGR of 2.8 percent was used to calculate the turbine operations at TRK. Thus, turboprops and all jet types have a CAGR of 2.9 percent from 2021 to 2040. The growth rates of piston aircraft, helicopter, and glider operations are based on the 2020 FAA ASF.

As with the other forecast methods, the 2021 projections were set to be below or at 2019 operation levels. All piston aircraft operations are projected to decrease during the forecast period; therefore, piston operations have not been adjusted to return to pre-COVID-19 levels. The ASF projects piston operations to decrease at an average of 1 percent for single-engine pistons and 0.5 percent for multi-engine pistons. Touch-and-go operations are projected at 35 percent of single-engine piston operations.

Table 2-30 shows the projected operations for each aircraft type and the total operations based on the peer airport method.

Table 2-30: Peer Airport Method Forecast

Aircraft Type	2019	2020	2021	2025	2030	2035	2040	'21-'40 CAGR
Piston	16,618	16,327	16,275	15,611	14,819	14,067	13,354	-1.0%
Piston T&G[1]	3,324	3,265	3,255	5,464	5,187	4,924	4,674	1.9%
Piston Twin	1,183	1,089	1,172	1,151	1,125	1,099	1,075	-0.5%
Turboprop	6,469	5,234	6,469	7,227	8,301	9,534	10,950	2.8%
Jet 2 (<12.5k lbs)	1,011	835	1,011	1,129	1,297	1,490	1,711	2.8%
Jet 3 (12.5-20k lbs)	1,652	1,755	1,652	1,846	2,120	2,435	2,796	2.8%
Jet 4 (20-50k lbs)	1,548	1,805	1,548	1,729	1,986	2,281	2,620	2.8%
Jet 5 (>50k lbs)	294	374	294	328	377	433	498	2.8%
Helicopters	948	747	948	1,011	1,097	1,189	1,290	1.6%
Gliders Only	3,287	1,886	3,287	3,427	3,611	3,805	4,010	1.1%
Glider Tow Plane[3]	3,287	1,886	3,287	3,427	3,611	3,805	4,010	1.1%
TOTAL	**39,621**	**35,203**	**39,199**	**42,352**	**43,532**	**45,063**	**46,986**	**1.0%**

Source: Mead & Hunt and TRK Airport records
CAGR: Compound Annual Growth Rate.

Historical Trend Forecast

The Historical Trend method carries the 2015 to 2019 5-year total annual operations historical CAGR of 7.5 percent for the forecast period. The 5-year period was used instead of a 10-year period to better capture recent trends. However, it should be noted the 2009 to 2019 CAGR is also equal to 7.5 percent and thus, would not change the results of the forecast.

This method recognizes the COVID-19 impact on operations in 2020 and assumes that 2021 operations will return to 2019 levels. The 7.5 percent CAGR is applied and projects operations to quadruple from 2019 operations in 2040. **Table 2-31** show the Historical Trend forecast for total annual operations.

Table 2-31: Historical Trends Method Forecast

Fiscal Year	Historical Trend
2019	39,621
2020	35,203
2021	39,621
2025	52,912
2030	75,962
2035	109,053
2040	156,560
'21-'40 CAGR	7.5%

Source: Mead & Hunt and FAA TAF
CAGR: Compound Annual Growth Rate.

PREFERRED OPERATIONS FORECAST

Of the five methods for operations forecasts analyzed, the Turbine Regression is the preferred forecast method. This method is selected for these primary reasons:

- This method reflects the strong correlation between local socioeconomic indicators to turboprop and jet operations.
- This method accounts for the growth TRK has experienced in the past 10-year period while also incorporating the effects of market maturation and TRK's limited capacity for additional based aircraft.
- This method replicates nationwide trends that show multi-engine piston aircraft operations declining.

The Turbine Regression method also incorporates more local characteristics such as the turbine aircraft fleet mix and the factors impacting single-engine piston operations. Through the integration of airport specific details such as hangar demand for the Pilatus PC-12 and the Cirrus aircraft models, this method results in the stability of turboprop and single-engine piston operations at TRK.

The Turbine Regression method is tied to socioeconomic projections for future GRP and income per capita in the Truckee-Grass Valley µSA. These projections are from California Department of Finance and Woods & Poole. Any significant change in actual future socioeconomic factors may influence future operations.

The Total Operations Regression method accounts for local socioeconomic factors that correlate to future operations. However, the expected capacity limitations at TRK prevented the selection of this method as the preferred forecast. Factors that TRK controls, such as limited hangar development, will limit based aircraft and therefore operations. This method also shows more aggressive piston aircraft growth and does not reflect nationwide trends that show single-engine piston and multi-engine piston aircraft operations declining.

Differing from the two regression methods, the Peer Airport method does not incorporate local socioeconomic trends since the growth rate is based on trends associated with the peer airports. While these airports may be considered similar at the time of analysis, a method incorporating the effects of the local population and economy on airport operations is preferred given the strong relationship between regional socioeconomics and TRK operation counts.

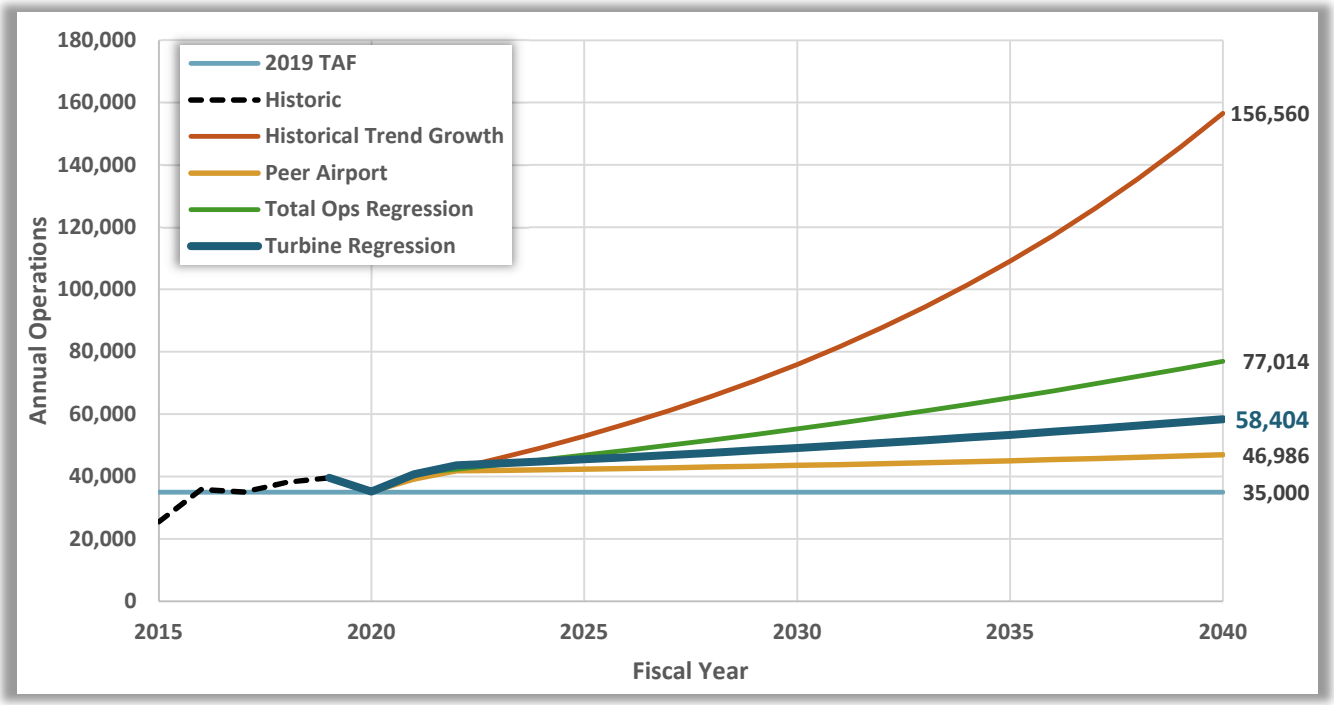
The 2019 TAF method is not recommended as it does not account for any growth that has occurred in recent years nor does it incorporate any potential region or nationwide trends. The Historical Trend method is not preferred due to the high growth rate that would be unsustainable and unlikely over the forecast period. **Table 2-32** and **Figure 2-7** summarizes each operation forecast method.

Table 2-32: Forecast Method Comparisons

FY	2019 TAF	Total Ops Regression	Turbine Regression (Preferred Forecast)	Peer Airport	Historical Trend
2019	35,000	39,621	**39,621**	39,621	39,621
2020	35,000	35,203	**35,203**	35,203	35,203
2021	35,000	41,002	**40,710**	39,199	39,621
2025	35,000	47,037	**45,508**	42,352	52,912
2030	35,000	55,846	**49,122**	43,532	75,962
2035	35,000	66,305	**53,377**	45,063	109,053
2040	35,000	78,723	**58,404**	46,986	156,560
'21-'40 CAGR	0.0%	3.5%	**1.9%**	1.0%	7.5%

Source: Mead & Hunt, FAA TAF, and TRK Airport records
CAGR: Compound Annual Growth Rate.

Figure 2-7: Operations Forecast Method Comparisons



Source: Mead & Hunt, FAA TAF, and TRK Airport records

Operations Forecast TAF Comparison

Table 2-33 shows the preferred operations forecasts versus the 2019 TAF. TRK records, which are based on camera counts and air traffic control observations, show a 13 percent difference in 2019 operations.

Table 2-33: 2019 TAF Versus Preferred Forecast

Fiscal Year	2019 TAF	Preferred Forecast (Turbine Regression)	Difference
2019	35,000	39,621	13.2%
2020	35,000	35,203	0.6%
2021	35,000	40,710	16.3%
2025	35,000	45,508	30.0%
2030	35,000	49,122	40.3%
2035	35,000	53,377	52.5%
2040	35,000	58,404	66.9%
'21-'40 CAGR	0.0%	1.9%	

Source: Mead & Hunt, FAA TAF, and TRK Airport records
CAGR: Compound Annual Growth Rate.

LOCAL AND AIR TAXI OPERATIONS

The FAA requires a preferred forecast to differentiate between local and itinerant operations. Air taxi operations, which are part of itinerant operations, are counted. Each of these operation categories with historical data and formulas are explained in the Historical Activity - Aircraft Operations section above.

Local Operations

Local general aviation operations are calculated using historical information provided by TRK. The formula used to determine local general aviation operations is as follows:

$$\textit{Local GA Operations} = 50\%\ \textit{Single Piston} + 100\%\ \textit{Single Piston T\&G} + 50\%\ \textit{Gliders} + 100\%\ \textit{Glider Tow}$$

Total itinerant operations are determined by subtracting total local operations from the total annual operations. This formula for itinerant/local operation split is retained for future operations and used to project operations for each category.

Air Taxi Operations

Air taxi operations make up of 12 percent of total operations. This was estimated using Vector data and information from control tower staff. Sporadic historical data on air taxi operations for TRK exist. The FAA TAF shows historical and future annual air taxi operations as 1,000 per year. TRK staff have indicated a greater presence in air taxi operators at TRK since the 2015 AMP.

The itinerant air taxi operations are forecasted using the preferred forecast's turbine fleet growth rate of 3.5 percent CAGR. This is due to most air taxi operations using turbine aircraft and is thus expected to

grow in line with turbine operations. Air taxi operations are expected to grow from 12 percent of total operations to 24 percent of total operations by 2040 using this method.

Table 2-34 shows the preferred forecast broken down by operation type. Both local and itinerant military operations projections match those determined by the 2019 TAF. This is due to military activity being dependent on the decisions of the U.S. Department of Defense rather than socioeconomic drivers; therefore, for planning purposes, military operations are projected to remain flat.

Table 2-34: Preferred Forecast by Operation Type

Aircraft Type	2019	2020	2021	2025	2030	2035	2040
Total Operations	**39,621**	**35,203**	**40,710**	**45,508**	**49,122**	**53,377**	**58,404**
Itinerant	**23,034**	**20,922**	**24,123**	**26,075**	**29,234**	**33,017**	**37,554**
Air Taxi	4,755	4,225	5,058	6,495	8,338	10,775	14,022
General Aviation	18,279	16,697	19,065	19,580	20,896	22,242	23,532
Military	24	24	24	24	24	24	24
Local	**16,587**	**14,282**	**16,587**	**19,432**	**19,888**	**20,360**	**20,850**
General Aviation	16,563	14,258	16,563	19,408	19,864	20,336	20,826
Military	0	0	0	0	0	0	0

Source: Mead & Hunt, TRK Airport records, FAA TAF

Based Aircraft Forecast

Based aircraft are located at TRK, either permanently or seasonally. At TRK, all based aircraft stored in hangars do not base (tie-down) on an apron. Because of TRK's location near resort destinations and vacation homes, the Airport experiences significant seasonal fluctuations in activity, including the number of aircraft that are stored year-round.

As mentioned in Historical Activity and Trends section, there are multiple sources for determining the permanent and seasonal aircraft based at TRK. The FAA requires a forecast that uses the NBAIP validated list, which is generally considered by the FAA as the official list of aircraft that base at TRK year-round. The NBAIP validated list will be forecasted to satisfy the FAA requirement of showing validated aircraft at TRK.

TRK also maintains thorough records of all aircraft that occupy a hangar at TRK. This list represents seasonal and year-round based aircraft. The TRK inventory list will be used to forecast all aircraft that base at TRK. This forecast assesses total based aircraft, which most accurately reflects the airport's storage facility needs.

BASED AIRCRAFT FORECAST METHODOLOGIES

Two forecasts for based aircraft are presented: Constrained Growth and Unconstrained Growth. The Constrained Growth method is limited by the number of hangar spaces available. The Unconstrained Growth method shows the number of based aircraft at TRK if TTAD were to build hangars based on market demand. As discussed in the Market Demand section, TRK currently has a waiting list of 107 aircraft, for either T-hangars or executive hangars. This includes applications submitted in 2020, which indicates strong demand for hangars through the COVID-19 pandemic. Based on the waitlist, regional demand, and the 2015 Demand Drivers Study, there is reason to assume that if TRK were to build 50 hangars, then 50 additional aircraft will base at TRK either year-round or seasonally.

Constrained Growth

This method directly ties the number of future based aircraft with the number of available hangars. Historically, the construction of hangars is done at the discretion of the TTAD Board. The last hangars built at TRK were 10 executive hangars (rows N and P, 65-foot doors) on the west airfield, west of hangar row M and Care Flight. Additional future hangar areas are designated in the 2015 AMP west of these hangars, with a transient apron. These hangars are retained for this ALP Update with analysis provided in Requirements and Improvements.

- A Super T-Hangar Financial Study was completed in 2020 to detail the costs and benefits of 12 future Super T-hangars (60-foot doors) with proforma financial analysis. These hangars match a similar configuration as shown in the 2015 AMP and are retained for this ALP Update and used to project future based aircraft. For the Constrained Growth forecast, it is assumed the Super T-hangars will be added in 2025 and filed by turboprops from the waitlist.
- Six executive hangars (65-foot doors) are retained for this ALP Update to project future based aircraft. These match a similar configuration shown in the 2015 AMP. For the Constrained Growth forecast, it is assumed six executive hangars will be built in 2030 and will accommodate small- to medium-sized corporate jets from the waitlist.

The Constrained Growth – TRK Inventory forecast shows the true total of aircraft that occupy hangars at TRK, either seasonally or year-round over the planning period. This is conditional on the number of hangars constructed and based on the assumptions presented above. **Table 2-35** details the specific aircraft types, with hangars added in five-year increments over the next 20 years.

Table 2-35: Constrained Growth – TRK Inventory Based Aircraft Forecast

Aircraft Type	2020	2025	2030	2035	2040	CAGR
Hangars Added	**0**	**12**	**6**	**0**	**0**	
Single-Engine Piston	173	173	173	173	173	0.00%
Multi-Engine Piston	15	15	15	15	15	0.00%
Turboprop	26	38	38	38	38	1.92%
Jet	7	7	13	13	13	3.14%
Helicopter	6	6	6	6	6	0.00%
Other	11	11	11	11	11	0.00%
Total	**238**	**250**	**256**	**256**	**256**	**0.37%**

Source: Mead & Hunt and TRK Airport records
CAGR: Compound Annual Growth Rate.

The Constrained Growth – FAA Validated based aircraft forecast is shown in **Table 2-36**. This only considers the aircraft that are based at TRK year-round and will be validated in the FAA database.

Table 2-36: Constrained Growth – FAA Validated Based Aircraft Forecast

Aircraft Type	2020	2025	2030	2035	2040
Single-Engine[1]	97	97	97	97	97
Multi-Engine[1]	8	8	8	8	8
Jet	1	3	4	4	4
Helicopter	4	4	4	4	4
Other	9	9	9	9	9
Total	**119**	**121**	**122**	**122**	**122**

1 Aircraft categories match FAA reporting groups. FAA groups turboprops in single-engine and multi-engine categories.
Source: Mead & Hunt and FAA NBAIP

Unconstrained Growth

The Unconstrained Growth method assumes that TTAD will build hangars to accommodate demand and waitlist, with unconstrained land for development. The Unconstrained method utilizes correlation and regression analysis to forecast based aircraft at TRK. Similar to the operations forecasts, the Unconstrained method is based on determining what socioeconomic and industry variables have strong multi-variable correlation (adjusted r-square great than 0.8) with TRK based aircraft. **Table 2-37** presents the six variables found to have the highest correlation coefficient with 2020 inventoried based aircraft. All socioeconomic variables are strongly correlated while the national general aviation fleet is considered moderately correlated. However, the national general aviation fleet variable was carried forward into the multi-variable regression analysis as it provides insight into national aircraft trends.

Table 2-37: 2009-2019 Based Aircraft Correlation Analysis

Correlation Analysis (2009-2019)	Correlation Coefficient
Population	0.821
Employment	0.818
Total Retail Sales	0.814
Income Per Capita	0.879
GRP	0.825
National GA Fleet	0.706

Sources: Mead & Hunt, TRK Airport records, W&P 2020, FAA ASF

Table 2-38 shows the top three adjusted R-square values of the different multi-variable combinations considered.

Table 2-38: Based Aircraft Multi-Variable Regression Comparison

Variables	Adjusted R Square
Income Per Capita, GRP	0.894
Population, Income Per Capita, GRP	0.883
Income Per Capita, GRP, National GA Fleet	0.867

Sources: Mead & Hunt, TRK Airport records, W&P 2020

The three-variable model with income per capita, GRP, and national general aviation fleet variables was selected for the Unconstrained based aircraft forecast. This is due to the strong relationships the regional economy and income levels have on aircraft ownership. Including the national general aviation fleet variable means the model considers national industry trends regarding how aircraft orders, deliveries, and preferences affect the future general aviation fleet mix across the country.

$$\begin{aligned} \textit{TRK Total Based Aircraft} \\ &= (\textit{Income Per Capita} \times 0.0279) + (\textit{GRP} \times -0.2595) \\ &+ (\textit{National Fleet} \times -0.0001) + -261.5068146 \end{aligned}$$

The Unconstrained based aircraft forecast is shown in **Table 2-39** separated by FAA aircraft category. The total based aircraft reflects the Multi-Variable Regression formula above. Rates for the aircraft types single-engine piston and multi-engine piston reflect historical growth rates at TRK. The ASF CAGR is applied to helicopters and other type aircraft to determine future based aircraft for each type. The growth rate for turbine aircraft is set at 3.9 percent CAGR. This is less than the historical CAGR, but still an aggressive rate that reflects higher demand in turbine aircraft throughout the planning period.

Table 2-39: Unconstrained Growth – TRK Inventory Based Aircraft Forecast

Aircraft Type	2020	2025	2030	2035	2040	CAGR
Single-Engine Piston	173	188	206	223	241	1.70%
Multi-Engine Piston	15	16	16	17	18	0.87%
Turboprop	26	31	38	46	56	3.91%
Jet	7	8	10	12	15	3.91%
Helicopter	6	7	7	8	8	1.63%
Other	11	12	12	13	14	1.05%
Total	**238**	**262**	**289**	**319**	**352**	**1.97%**

Source: Mead & Hunt and TRK Airport records
CAGR: Compound Annual Growth Rate.

PREFERRED BASED AIRCRAFT FORECAST

The Unconstrained forecast shows that demand for hangars may be tied to local economic factors and over 100 hangars could be built over the planning period and likely be filled. However, building hangars at this magnitude does not match TTAD's mission statement to limit community impacts. Hangars are constructed at the discretion of TTAD. Therefore, the Constrained based aircraft is selected for FAA approval. This forecast reflects filling the future hangars analyzed in the 2015 AMP and shown on the 2015 ALP.

The preferred based aircraft forecasts for TRK are presented in **Table 2-40**. This includes the TRK Inventory forecast, representing annual and seasonal based aircraft, the FAA Validated forecast, representing year-round based aircraft in the NBAIP database, and the FAA TAF for comparison. The 2019 TAF has a flat forecast for validated based aircraft at TRK. The TAF projections do not account for the fact that TRK hangar space has been at capacity, and the waiting list for hangars continues to grow.

Table 2-40: TRK Preferred Based Aircraft Forecast

Fiscal Year	TRK Inventory	FAA Validated	2019 TAF	TAF Comparison
2020	238	119	117	-1.7%
2025	250	121	117	-12.0%
2030	256	122	117	-17.1%
2035	256	122	117	-17.1%
2040	256	122	117	-17.1%
'20 - '40 CAGR	0.4%	0.1%	0.0%	

Source: Mead & Hunt, TRK Airport records, FAA TAF and NBAIP database
CAGR: Compound Annual Growth Rate.

Critical Aircraft

Runway design, safety areas, taxiway design, and building setbacks are determined by the critical aircraft using the airport. The critical aircraft is the most demanding type or group of aircraft with similar characteristics that operate more than 500 operations at an airport annually, excluding touch-and-go operations.

Many airfield design considerations and setbacks are based on characteristics of the critical aircraft. For the purposes of determining standards for runways and taxiways, aircraft are categorized by their size and performance in the Aircraft Approach Category (AAC) and the Airplane Design Group (ADG). These categories, along with runway approach minimums, form the Runway Design Code (RDC), which corresponds with FAA standards for appropriate design parameters for each runway. The most demanding AAC and ADG at an airport set the Airport Reference Code (ARC). The FAA defines standards for taxiways using a similar categorization system called the Taxiway Design Group (TDG).

Airport Design Codes

Runway Design Code (RDC):
The FAA coding system made up of three standards: Aircraft Approach Category, Airplane Design Group, and Approach Visibility Minimums.

Airport Reference Code (ARC):
The FAA coding system that indicates the airport's highest RDC, without taking Approach Visibility Minimums into account.

Aircraft Approach Category (AAC):
This standard is based on the approach speed (in knots) of the design aircraft.

Airplane Design Group (ADG):
This second standard is based on the wingspan and tail height of the design aircraft.

EXISTING CRITICAL AIRCRAFT

Observing the Vector data with aircraft model types provides a straightforward source to determine the critical aircraft at TRK. For this analysis only multi-engine piston, turboprops, and jets are observed. Single-engine pistons may operate more frequently at TRK but are smaller in size and have slower approach speeds – these aircraft types will not determine the critical aircraft.

Table 2-41 shows the most demanding aircraft regularly using TRK, with total operations in 2019, and design code designation. Aircraft with B-II RDC make up most of this list, with the Pilatus PC-12 operating at TRK more than any other turboprop or jet.

Table 2-41: 2019 Operations by Largest Aircraft Regularly Using TRK

Aircraft Model		Aircraft Type	2019 Operations	AAC	ADG	TDG
Pilatus PC-12	**PC12**	Turboprop	2,707	B	II	1A
Beech 350 Super King Air	**B350**	Turboprop	735	B	II	2
Scoata TBM 700	**TBM7**	Turboprop	655	A	I	1A
Embraer Phenom 300	**E55P**	Jet	532	B	II	1B
Beech 200 Super King Air	**BE20**	Turboprop	450	B	II	2
Cessna Citation Sovereign	**C680**	Jet	405	B	II	1B
Cessna Citation Excel	**C56X**	Jet	398	B	II	1B
Beech King Air 90	**BE9L**	Turboprop	290	B	II	1A
Bombardier Challenger 300	**CL30**	Jet	270	B	II	1B
Piper PA-46 Malibu	**P46T**	Turboprop	233	A	I	1A
Cessna Citation	**C25A**	Jet	233	B	II	2

Sources: Operations: TRK Airport records, CY 2019. Design Codes: FAA-Aircraft-Char-Database-v2-201810.xls

Other large aircraft that operate at TRK are the Bombardier Challenger 600 series (RDC C-II), the Hawker 800 Series (RDC B-II), Cessna Citation X (RDC C-II), Falcon jets (RDC B-II), Global Express jets (RDC B-II), and the Gulfstream jet series (RDC C-III). None of these aircraft with higher ADG or AAC have total operations over 150 annually, and therefore do not meet the threshold for regular use to determine the RDC or ARC.

Based on the Vector data presented in **Table 2-41** above:

- **The existing ARC for TRK is B-II.**
- **The existing critical aircraft is the Pilatus PC-12.**

The 2015 AMP shows the existing critical aircraft as the Cessna Citation 560, and the ARC as B-II. The 2019 operation data verifies the ARC from the 2015 AMP. However, the PC-12 has overtaken other aircraft as the most frequent operator and is the representative critical aircraft going forward.

FUTURE CRITICAL AIRCRAFT

The 2015 AMP shows no change to the critical aircraft and ARC from the Cessna Citation 560 and B-II. This ALP Update is not proposing any significant facility changes that would alter the Airport's role, and therefore no changes are made to the existing critical aircraft or RDC. This ALP Update retains the future condition proposed by the 2015 AMP, with the future ARC as B-II. The Airport role and significant facility additions may be reevaluated with a full master plan update.

Forecast Summary

- The forecasts account for impacts from the COVID-19 pandemic and consider the return to pre-COVID-19 levels in December 2020. COVID-19 is addressed again in the operations forecast, with sustained operations expected to remain at or above 2019 levels in 2021.
- According to the FAA ASF, the long-term outlook for general aviation is stable, mainly driven by turbine aircraft activity.
- The 2015 Demand Drivers Study found that two major factors influence demand at TRK, and these are outside of the Airport's control: the location of the Airport relative to the Truckee - Tahoe Area and the economic health of the nation and region.
- The waitlist inventory as of May 2021 is 135 aircraft.
- Correlation analysis shows that operations at TRK have a relatively strong relationship with socioeconomic variables population, employment, total retail sales, income per capita, and GRP for Placer County, Nevada County, and the Sacramento-Roseville CSA.
- The Turbine Regression is the preferred operations forecast method for these primary reasons:
    - It reflects the strong correlation between local socioeconomic indicators to turboprop and jet operations.
    - It accounts for the growth TRK has experienced in the past 10-year period while also incorporating the effects of market maturation and TRK's limited capacity for additional based aircraft.
    - It replicates nationwide trends that show multi-engine piston aircraft operations declining.
- The Constrained Growth method is the preferred based aircraft forecast as this represents hangar development at the discretion of the TTAD Board.
- This ALP Update retains the future condition proposed by the 2015 AMP, with the existing and future ARC as B-II.
    - The existing and future critical aircraft is the Pilatus PC-12.

References

Federal Aviation Administration. <date of access or published information>. Air Traffic Activity System (ATADS). https://aspm.faa.gov/opsnet/sys/Main.asp?force=atads#:~:text=Air%20Traffic%20Activity%20System%20%28ATADS%29%20The%20Air%20Traffic,data%20for%20the%20previous%20month%20is%20made%20available.

Respada. 2020. "Demand for private aviation surges in response to COVID-19." https://www.prnewswire.com/news-releases/demand-for-private-aviation-surges-in-response-to-covid-19-301114071.html

Tahoe Mountain Realty. 2020. "2020 Year-End Market Review." https://www.tmrrealestate.com/january-2021-market-update/

Tahoe Regional Planning Agency. 2021. "Tahoe Facts." https://www.trpa.org/tahoe-facts/

Truckee Chamber of Commerce. 2019. "Truckee.com Visitor's Guide." https://www.truckee.com/truckee-2018-2019-visitor-guide/