# Eastern Sierra Air Service Strategic Plan

NOVEMBER 2017

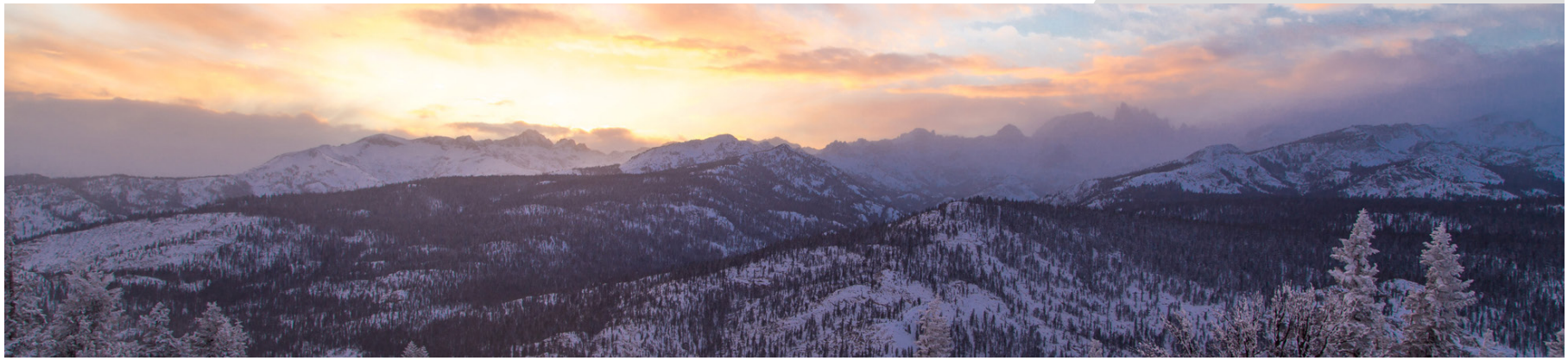
Mammoth Lakes

# Mammoth Lakes

Mead &Hunt

# Contents

# 1 Introduction



As home to Mammoth Mountain and as the eastern gateway to Yosemite National Park, local, commercial air service is important in supporting the more than 1.6 million annual visitors. In addition, the business community and residents need local access to air service to avoid the more than three-hour drive from Reno-Tahoe International Airport, the closest alternate commercial service airport. While existing Alaska Airlines and United Airlines services are valued by the community, reliability issues have impacted use of local air service.

*"The primary objective of the Eastern Sierra Air Service Strategic Plan is to provide the information and recommendations necessary to guide air service development efforts over the next five to 10 years to achieve the air service goals."*

## Air Service Goal

The primary air service goal is to provide reliable, sustainable and successful air service to the Eastern Sierra by growing existing air service via increasing flight frequency and seat capacity on available service and adding additional nonstop destinations and/or air carriers. Nonstop service from points east of Mammoth Lakes is a priority as well as improving reliability. Expanding air service will be supported by increasing the number of destination visitors, particularly those that have a tendency to book early and stay longer (not just weekends), while at the same time offering air service for local businesses.

## Strategic Plan Objectives

The primary objective of the *Eastern Sierra Air Service Strategic Plan* is to provide the information and recommendations necessary to guide air service development efforts over the next five to 10 years to achieve the stated air service goals. By reviewing airline strategy, availability of aircraft and Eastern Sierra air service demand, next steps and actionable items in the air service development process are provided.

## Local Partners

Mammoth Lakes Tourism works in cooperation with the Town of Mammoth Lakes to provide marketing and sales promotion outreach for local, commercial air service. Mammoth Lakes Tourism is responsible for coordinating air service and funding subsidies at Mammoth Lakes Airport (MMH) in conjunction with other partners including the Town of Mammoth Lakes, Mammoth Mountain Ski Area and Mono County. The Town of Mammoth Lakes is also engaged in discussions with Inyo County, the operators of Bishop Airport (BIH) in Bishop, CA, to assess the potential to use BIH as a reliever or primary airport to improve reliability of air service by reducing cancellations. BIH is located approximately 45 miles to the southeast of Mammoth Lakes (discussed further in *Section 7*).

## Section Descriptions

This plan provides objective, comparative data and statements of fact compiled from industry sources on the Eastern Sierra region, airlines and aircraft. The following is a brief summary of the information covered in each section in this report.

### Section 1 – Introduction

This section provided the background and goals of the *Eastern Sierra Air Service Strategic Plan*.

### Section 2 – Industry Trends

The industry trends section provides an overview of macro and micro trends impacting commercial service to the Eastern Sierra region and across the United States to better understand and evaluate the Eastern Sierra air service market.

### Section 3 – Airport Characteristics

This section reviews MMH's environmental, physical and operational characteristics, including items such as air temperatures, altitude, weather conditions and seasonality of service.

### Section 4 – Existing Air Service

This section provides a summary of existing air service at MMH. Historical and future schedules are also reviewed. Passengers, revenue, load factors, revenue per available seat mile (RASM) and other factors are benchmarked across similar airports/markets to assess the performance of each market for the airline. This helps guide the need for additional frequency or seat capacity to existing nonstop markets and the carrier's potential willingness to expand to additional destinations.

### Section 5 – Air Service Opportunities

The air service opportunities section reviews the airline strategy and fleet mix for potential and existing airlines. It includes airline expansion/contraction with an individual hub focus. This section identifies potential new market opportunities for the Eastern Sierra region.

### Section 6 – Economic Impact Analysis

This section analyzes the economic impact of current air service at MMH. It also reviews the projected impact of potential new routes and capacity as identified in *Section 5*.

### Section 7 – Peer Review

This section provides a peer review of the work completed by Wadell Engineering Corporation for BIH regarding the airport's ability to become Part 139 compliant.

### Section 8 – Next Steps

Opportunities are prioritized in this section for the Eastern Sierra region with a division of the top opportunities for a five-year and 10-year projection period. Based on these conclusions, action items are identified.

# 2 Industry Trends


This section reviews industry trends, specifically trends that have impacted or will impact air service to the Eastern Sierra region. For example, recent airline profitability is a strength that could provide opportunities for Eastern Sierra whereas the pilot shortage is a weakness and may threaten current service levels or potential growth. Specific airline-by-airline trends are discussed in *Section 5*.

**The following trends are reviewed in this section:**

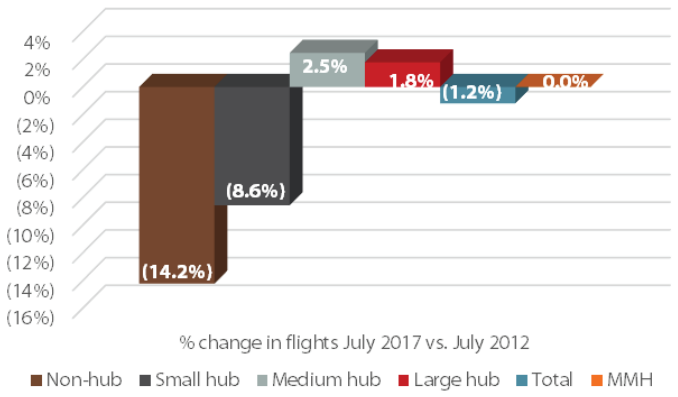
- Frequency and capacity changes
- Airline profitability
- Bankruptcies, mergers and acquisitions
- Fleet changes
- Fluctuating price of fuel
- Pilot shortage
- Low-cost carrier competition

## Frequency and Capacity Changes

Over the past decade many airports experienced capacity reductions as carriers merged, mainline hubs/fleets were realigned, regional jets replaced mainline flying in the US and carriers shifted resources to international markets. A total of 87 US airports with air service in 2007 do not have scheduled service in 2017. Much of the negative change in flights in the last five years was experienced by non-hub and small hub airports as shown in **Exhibit 2.1**. Conversely, seats have increased across all airport categories (**Exhibit 2.2**), but seats at non-hub and small hub airports increased at a much slower pace than medium and large hubs.

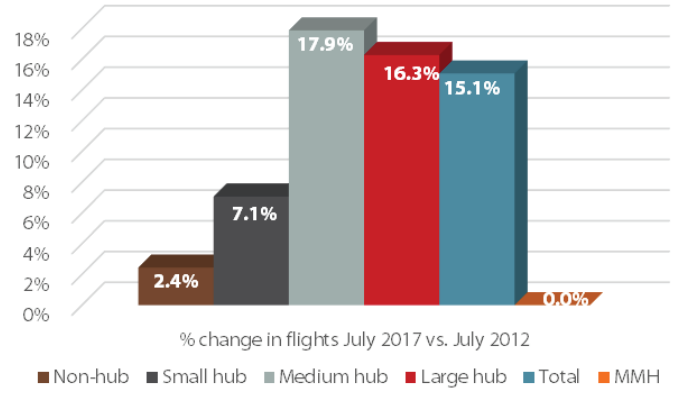
**Table 2.1** provides an overview by top domestic airlines of total scheduled flights and seats over the past five years. Overall domestic flights have decreased 2.8 percent as major hub carriers shifted to larger aircraft. At the same time, domestic seats increased 12.7 percent while international seats grew 32.7 percent. Growth differs greatly from airline to airline with most airlines increasing seats since 2012.

**EXHIBIT 2.1 US Domestic Flight Change by Airport Size**




SOURCE: Diio Mi Scheduled Seats

**EXHIBIT 2.2 US Domestic Seat Change by Airport Size**




SOURCE: Diio Mi Scheduled Seats

**TABLE 2.1 Scheduled Flights and Seats Comparison by Airline (July 2017 vs. July 2012)**

| Carrier | Flights | Seats |
|---|---|---|
| **Domestic Schedule Comparison** | | |
| American Airlines | (3.0%) | 7.3% |
| Southwest Airlines | (3.7%) | 6.1% |
| Delta Air Lines | (3.6%) | 10.5% |
| United Airlines | (18.1%) | 3.0% |
| Alaska Airlines | 28.1% | 34.3% |
| JetBlue Airways | 26.9% | 29.3% |
| Spirit Airlines | 122.5% | 148.0% |
| Frontier Airlines | (4.7%) | 33.6% |
| Allegiant Air | 100.7% | 123.2% |
| Total All Domestic | (2.8%) | 12.7% |
| **International Schedule Comparison** | | |
| Total All International | 18.2% | 32.7% |

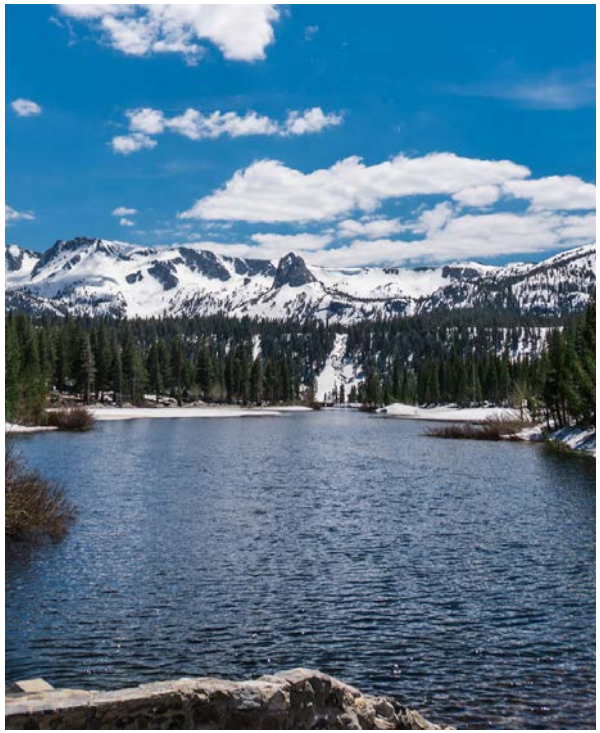
SOURCE: Diio Mi; NOTE: Ranked by July 2017; Historical data includes merged airlines

## Airline Profit and Loss

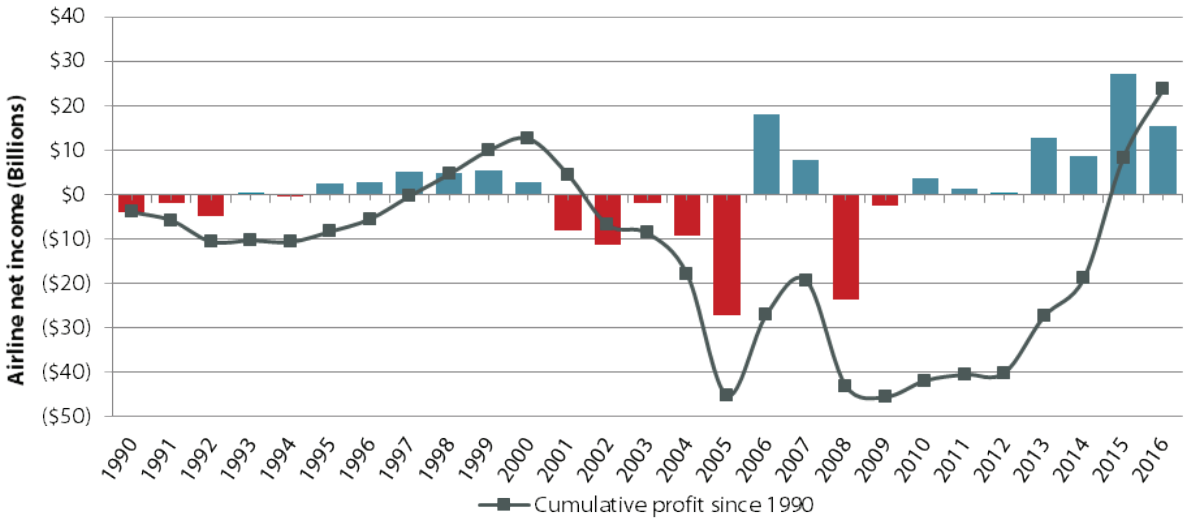
For many years traditional network carriers struggled to survive. Since 1990, multiple airlines have entered and exited bankruptcy (discussed on page 2.4). However, in recent years, airlines are thriving as shown in **Exhibit 2.3**, which shows the US airline industry net income from 1990 through 2016.

Until recently, airlines have not sustained strong profitability. From 2001 through 2005, the combination of depressed air travel demand and higher costs produced financial losses which were more severe and sustained over a longer period of time than previous downturns. The industry rebounded in 2006/2007 only to suffer significant losses in 2008/2009 with the increased cost of fuel and the economic recession. Since 2010, the airlines have consistently been profitable, finally overcoming previous losses and achieving a cumulative net profit in 2015 for the first time since 2001. From 2010 to 2016, the airlines had a combined net income of over $69 billion. Profit drivers have included consolidation, capacity restraint, increased ancillary revenue (e.g., bag fees) and a reduction in fuel cost. To date in 2017, strong profitability is continuing with $9 billion in net profits through the third quarter of 2017, but average net margins have slipped about 2 percentage points year-over-year indicating increasing cost pressures and slowing unit revenue growth.

For the Eastern Sierra region, airline profitability is a strength for potential new market opportunities as profits often equate to airline growth versus contraction in times of net losses. Alaska Airlines and United Airlines currently provide service to MMH and both airlines have seen substantial increased profitability in recent years.



### EXHIBIT 2.3 US Airline Industry Net Income




*SOURCE: Diio Mi, Form 41 Net Income (All Airlines, Total System)*

## Bankruptcies, Mergers and Acquisitions

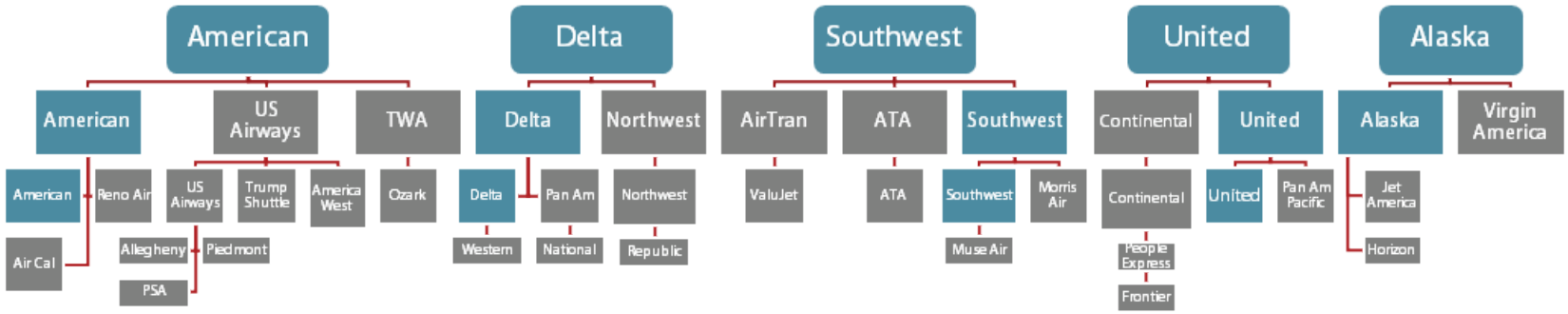
Since the airline industry deregulation in 1978, many airlines have come and gone as the industry and economy evolved. The economic woes of the 2000 through 2005 period pushed many airlines into financial distress. In spite of layoffs, wage and benefits cuts, the pruning of amenities, and emphasis of cost savings through automation, many airlines moved into bankruptcy reorganization protection. A number of airlines ceased operations during this time period or merged with other airlines. Examples of service cessation within the last 10 years include Colgan Air in 2012, Air Midwest in 2008, Skybus Airlines in 2008 and Big Sky Airlines in 2008. Chapter 11 bankruptcy filings included PenAir (2017), Pinnacle Airlines (2012), American Airlines (2011), Gulfstream International Airlines (2010) and Mesa Air (2010) to name a few.

More recently, airline consolidation (i.e., mergers) has led to just five major airlines (American Airlines, Delta Air Lines, United Airlines, Southwest Airlines and Alaska Airlines) as shown in **Exhibit 2.4** and provides a depiction of the impact of consolidation. These five major airlines control 90 percent of domestic capacity.

There have been few entrant carriers in the past five years, leaving less options for communities negatively impacted by industry changes. The continued consolidation of domestic airlines (such as the recent Alaska Airlines/ Virgin America merger) can be a threat to the Eastern Sierra region's air service as fewer carriers are available to provide air service options, but as carriers like Alaska and United compete more aggressively for regional presence, the Eastern Sierra region could see some opportunities emerge.

> *"The five major airlines, including American Airlines, Delta Air Lines, United Airlines, Southwest Airlines and Alaska Airlines, control 90 percent of domestic capacity."*

**EXHIBIT 2.4 Mergers and Acquisitions**



## Fleet Changes

Fleet changes at the major and regional airlines have impacted airports significantly and will continue to have a major impact in the years ahead as older, smaller aircraft are phased out. The composition of regional airline fleets has changed dramatically since the mid-1990s. There has been a marked decline in regional airline turboprop and smaller regional jet fleets. They have been replaced by larger regional jets and 70-plus seat Bombardier Q400 turboprops. As smaller aircraft have been rapidly retired from airline fleets, there are currently no new replacements being manufactured. As a result, smaller communities with limited passenger demand are running out of traditional air service options.

The regional jet evolution started initially with 37- to 50-seat jets. They were used to connect smaller markets to more distant hubs that were not previously accessible with turboprop aircraft. Approximately 1,500 small regional jets were delivered to US carriers, with most deliveries occurring by 2006. There have been no orders for 50-seat regional jets in nearly a decade.

In the early 2000s, the 70-seat regional jet with first class seating was born. These larger regional jets are similar to the larger, mainline aircraft product with further range and better performance. Many of the 50-seat regional jets are being replaced with larger regional jets. This transition to larger aircraft often results in fewer departures to offset the additional seats in the market. **Table 2.2** provides aircraft type by total departures over the past five years.

**TABLE 2.2 Equipment Use – 5-Year Change in Departures**

| | Departures | | |
|---|---|---|---|
| **Aircraft Type** | **July 2017** | **July 2012** | **Change** |
| **Turboprop (< 30)** | 46,016 | 55,494 | (17%) |
| **Turboprop (30-50)** | 16,587 | 35,467 | (53%) |
| **Turboprop (50+)** | 12,507 | 12,611 | (1%) |
| **Regional jet (30-50)** | 108,878 | 186,163 | (42%) |
| **Regional jet (51-70)** | 53,419 | 51,367 | 4% |
| **Regional jet (71-100)** | 91,129 | 47,206 | 93% |
| **Narrow-body (70-125)** | 21,719 | 41,155 | (47%) |
| **Narrow-body (126-160)** | 263,820 | 256,916 | 3% |
| **Narrow-body (> 160)** | 123,124 | 67,118 | 83% |
| **Total U.S. Domestic** | **741,810** | **759,861** | **(2%)** |
| **Turboprop** | 75,110 | 103,572 | (28%) |
| **Regional jets** | 253,426 | 284,785 | (11%) |
| **Narrow-body jets** | 408,663 | 365,189 | 12% |

*SOURCE: Diio Mi*

Turboprop aircraft have declined the most, with a decrease of 28 percent, followed by regional jet aircraft at 11 percent. However, the decline in regional jet aircraft is solely in the 30- to 50-seat category. Use of the larger regional jets has increased significantly with 71-seat or larger regional jets up 93 percent.

Regional jets and large turboprops play a critical role at MMH with all existing service being flown on those aircraft types. MMH has managed this fleet evolution so far and will continue to need to do so in the future since all service is on larger turboprops or regional jets. The trend toward larger aircraft requires that demand continue to grow so that added frequencies or new markets don't dilute the traffic volume on the current flights. As more of the smaller aircraft are retired, it becomes harder to justify growth without increasing demand to minimize the impact on existing service.

## Fluctuating Price of Fuel

The cost of fuel historically has been one of the key drivers of the airline industry's inability to sustain ongoing profitable operations. Increases in fuel cost adversely affect airlines in two ways:

- Absolute increases in overall expenses
- Reduced demand as higher gas prices mean less discretionary income for air travel

Increases in operating expenses accompanied by lower demand decreases overall profit opportunities, which in turn curtails growth. Lower capacity growth means less opportunity for small communities to increase service levels as competition for limited resources increases.

**Exhibit 2.5** shows the fluctuating price of fuel since 2005 with the dramatic increase in fuel in 2008. In response, airlines reduced flying, raised airfares and retired many fuel inefficient aircraft. The opposite reaction also occurs when fuel prices drop as seen in recent years. Declines in fuel cost have increased profits and put pressure on the airlines to reduce average fares. The up-tick in September 2017 shows the spot price impact of Hurricanes Harvey and Irma which hopefully should subside as refineries return to normal production. The current price of fuel is considered a strength for the Eastern Sierra region; however, this can quickly become a threat with any significant sustained price increase. With the threat of fuel price volatility, carriers generally are reluctant to grow capacity in response to improvements in the overall economy.

> *"The cost of fuel historically has been the single largest source of the airline industry's inability to sustain ongoing profitable operations."*

**EXHIBIT 2.5 Fluctuating Price of Fuel**


SOURCE: *US Energy Information Administration for Gulf Coast Jet Fuel Spot Price Per Gallon through September 11, 2017*

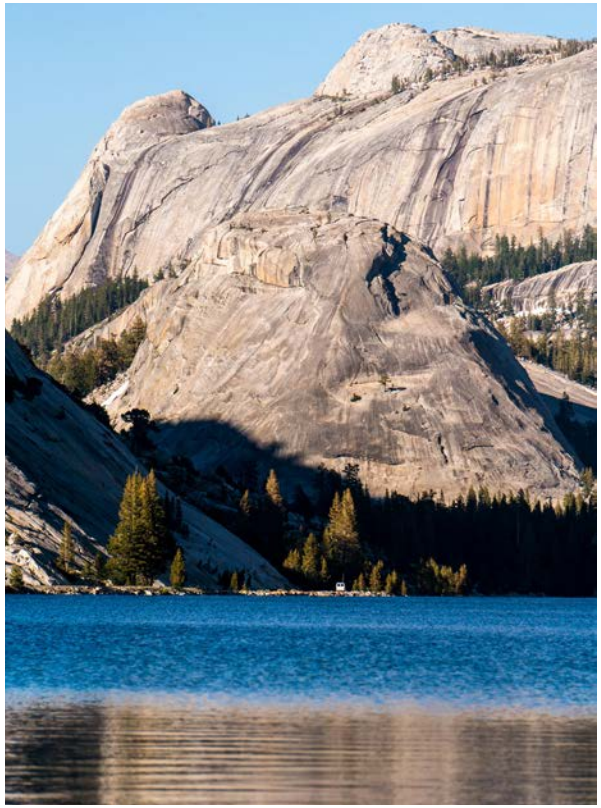
## Pilot Shortage

Regulatory requirements have led to pilot shortages that continue to have a very negative impact on small airports across the nation. The regulatory changes were brought about by a Colgan Air accident in February 2009. Public and government outcry over pilot training and crew rest led to changes in the rules that affect pilot availability. The most significant change was the requirement that all pilots for Part 121 carriers be Airline Transport Pilot (ATP) rated, which requires 1,500 hours of flight time. In the past a first officer could have as few as 250 hours with a Commercial Certificate. Limited options exist today for getting from 250 hours to 1,500 hours. There are significantly fewer military pilots entering the workforce as the military is training fewer pilots annually. Civilian (private) flight training is drastically more expensive than a decade ago, and costs are harder to justify for trainees. It can cost up to $100,000 for training up to Certified Flight Instructor. Many instructors make less than $20,000 per year upon graduation and need to instruct for several years to get to 1,500 hours total.

Other changes included a mandatory retirement age for airline pilots and longer minimum crew rest, an increase from eight hours to 10 hours. Pilot retirements will accelerate over the next five years as pilots hired during the 1980s hiring boom start to retire. The result of these changes on regional airlines is significant, and hiring pressure has been reported by the airlines. While mainline airlines continue to recruit from regionals, the regional airlines are having difficulty keeping up with pilot recruitment and retention. They are essentially a pipeline for the mainline airlines.

Several regional airlines have shrunk or announced closure due to pilot concerns. In addition, the pilot shortage has sped the retirements of 50-seat regional jets and growth in smaller mainline aircraft. This is a direct threat to regional air service at airports like MMH. One regional airline that has recently been impacted significantly is Horizon Air. Horizon operates Alaska Airlines' service to MMH and, in the summer of 2017, ran into a severe shortage of pilots to fly their Bombardier Q400 turboprop aircraft. Hundreds of flights were canceled during the second half of 2017. The Horizon pilot shortage will likely continue to impact service into the first half of 2018. While MMH schedules have not yet been affected, the shortage can ripple through an airline's system creating operational challenges even in markets where flights haven't been cut. It could also affect seasonal schedule additions like MMH's winter San Diego service.

In October 2017, a FAA Aviation Rulemaking Committee recommended modification of the 1,500-hour training requirement for first officers. There is potential that this will help bolster efforts to address the pilot shortage. The FAA's Air Carrier Training Advisory Rulemaking Committee have recommended two separate approaches to modify the rule that is supported by the Air Line Pilots Association, the Regional Airline Association, Airlines for America, Delta Air Lines and other aviation stakeholders. The results of these efforts is yet to be seen but may remedy some of the pilot shortage issues if implemented.



*"Regulatory requirements have led to pilot shortages that continue to have a very negative impact on small airports across the nation. The regulatory changes were brought about by a Colgan Air accident in February 2009."*

## Low-Cost Carrier Competition

Low-cost carriers (LCCs) have been a part of the industry fabric for 40-plus years, most successfully illustrated by Southwest Airlines' growth into what has become the largest domestic airline, both in terms of flights and passengers carried. As part of the natural marketplace, major network carriers like American Airlines, Delta Air Lines and United Airlines have learned to compete successfully with them. The biggest change in the competitive dynamic in most recent years has been the evolution and growth of the ultra-low-cost carriers (ULCCs) like Spirit Airlines, Frontier Airlines and Allegiant Air who have taken average fares to new lows and have forced the established carriers to rethink the way they compete.

**Table 2.3** shows the average domestic fares by airline for the year ended March 31, 2017, broken down by non-ULCCs and ULCCs. While the traditional LCCs like Southwest and JetBlue generate fares that are 25 to 30 percent less than the average for network carriers, the ULCCs like Allegiant, Frontier and Spirit averaged fares that are 65 to 70 percent lower than the traditional airlines. This is a very different pricing dynamic than the network carriers have traditionally competed against. Even traditional LCCs like Southwest find themselves with pricing competition that has become a major challenge.

In addition to the steep discounted pricing, the traditional carriers are seeing more of their networks affected by this new pricing dynamic. Just five years ago, only 15 percent of US domestic passengers had a ULCC option in their market. Today, just five years later, that percentage has more than doubled to 33 percent. Network airlines are having to adapt rapidly to this new intensity of competition. American, Delta and United have come out with a form of basic economy fares to price themselves more competitively in markets where they overlap with these carriers. Many of these programs now have tiered pricing options where consumers can pay the lowest price by giving up amenities that typically accompany normal fares, like seat selection, baggage check, carry-ons, priority boarding, meals, etc.

The evolution of price competition is accelerating as the ULCCs grow at a pace much faster than the rest of the industry, and airlines are experimenting and adapting rapidly. While ULCCs haven't yet made it to markets like the Eastern Sierra region, some of the network carriers are rolling out basic economy pricing across their entire systems, so those options could become available for MMH air travelers. While these lower fares can generate large increases in traditional passenger levels, the much lower fares make it more difficult for traditional airlines to cover the costs of their operations and can jeopardize traditional markets if the revenue impact moves faster than an airline's ability to manage their cost structure.

## Summary

The most significant industry trends have been reviewed in this section. For the Eastern Sierra region, negative impacts from bankruptcies, mergers and acquisitions limiting the number of potential air carriers as well as the pilot shortage are anticipated to continue. While July 2017 did not see an impact, total departures and seats have declined over the past five years, similar to what other non-hub airports across the nation have experienced with frequency and capacity changes.

**TABLE 2.3 Average Domestic Fare by Airline**

| Carrier | Avg. Dom. Fare ($) | Avg. Yield (¢) | Average Stage Length |
|---|---|---|---|
| **Non-ULCC** | | | |
| **Alaska Airlines** | $164 | 12.8 | 1,275 |
| **American Airlines** | $196 | 16.8 | 1,167 |
| **Delta Air Lines** | $201 | 17.5 | 1,141 |
| **JetBlue Airways** | $151 | 12.3 | 1,206 |
| **Southwest Airlines** | $135 | 14.1 | 950 |
| **United Airlines** | $212 | 15.5 | 1,353 |
| **Average Non-ULCC** | **$178** | **15.6** | **1,141** |
| **ULCC** | | | |
| **Allegiant Air** | $65 | 6.2 | 918 |
| **Frontier Airlines** | $79 | 7.9 | 1,167 |
| **Spirit Airlines** | $54 | 5.2 | 1,045 |
| **Average ULCC** | **$66** | **6.3** | **1,049** |

*SOURCE: Diio Mi; YE March 31, 2017*

However, fleet changes will have less impact on the region as MMH is already served by larger turboprops and regional jets but focusing on increasing demand to/from the Eastern Sierra region will need to be a priority so that new destinations don't negatively impact existing markets. Eastern Sierra will continue to benefit from the positive impact of airline profitability and the overall impact of low-cost carrier competition on fares.

# 3 Airport Characteristics


This section reviews a variety of airport characteristics at MMH that must be taken into account in the Eastern Sierra region's air service development efforts. Characteristics reviewed include pavement strength, runway length, runway capacity, airfield design constraints, geography, weather and environmental considerations.

## Pavement Strength

The current pavement strength of the runway, taxiways and main apron are designed to accommodate use by aircraft with a single-wheel main gear weighing up to 80,000 pounds and aircraft with dual-wheel main gear weighing up to 115,000 pounds. Canadair Regional Jets (CRJ), Embraer Regional Jets, Bombardier C Series, Bombardier Q400s, Airbus A319 and Boeing 737 aircraft are all examples of aircraft with dual-wheel main gear. MMH can currently accommodate the weight of the CRJ series, the Q400 and Embraer 175. The pavement strength would need to be increased before MMH could be regularly served by the Airbus A319, Boeing 737 models and the Bombardier CS series aircraft.

## Runway Length

MMH's single runway is 7,000 feet long by 100 feet wide. This width meets Federal Aviation Administration (FAA) standards for the existing and future critical aircraft defined in the currently approved *Airport Layout Plan* (ALP).

MMH's elevation and summer temperatures reduce the ability of aircraft wings to produce lift. During summer months, existing aircraft operating at MMH must sometimes reduce passenger loads to make takeoff possible. The ALP *Narrative Report* indicates that an extension to a runway length of 9,000 feet is needed to accommodate a fully loaded Boeing 737. However, the ALP does not explicitly indicate that the airfield would be modified to meet the design standards for this category aircraft. Meeting airfield design standards for these larger aircraft would almost certainly require relocating the parallel taxiway 100 feet to the east. All of the hangars along the taxiway would need to be relocated.


Airport planning for runway length normally assumes that aircraft will be operating at their maximum takeoff weight at the mean maximum temperature of the hottest month for the airport. However, given the seasonal pattern in airline service at MMH, it is appropriate to consider other scenarios. It is possible that there are commercial service aircraft that could operate with acceptable passenger loads from the existing runway during the winter ski season that could not operate during the summer. Additionally, most flights at MMH currently operate with less than full passenger loads.

## Runway Capacity

In 2016, MMH had an estimated 6,816 aircraft operations (e.g., a landing or take-off). MMH has an annual service volume capable of supporting approximately 230,000 annual operations. Therefore, runway capacity is not a constraint.

## Airfield Design Constraints

The recent ALP update identified several nonstandard conditions, including:

- Objects are penetrating the runway and taxiway object free areas.
- Objects are penetrating the threshold siting and departure surfaces.
- One section of the runway safety area does not meet grading standards.
- The separation between the runway and its parallel taxiway is smaller than standard.

These nonstandard conditions are inconsistent with current FAA design standards. However, they are not necessarily operational constraints. The FAA may accept operational and management measures to provide a similar level of safety. It is expected to be more difficult though to obtain FAA approval for larger commercial service aircraft to use MMH with these nonstandard conditions. The FAA's decisions will be based upon the specific conditions at MMH and cannot be anticipated.

It is not possible to always predict FAA staff's interpretation of their guidance documents. However, based upon historical decisions it appears unlikely that the FAA would approve use of MMH by Boeing 737 class aircraft without bringing the parallel taxiway and other facilities into compliance with standards for those aircraft. It is particularly unlikely that a runway extension would be funded by the FAA without fully meeting standards for the aircraft that it would serve.

## Geography

MMH is located in the Sierra Nevada Mountains at a field elevation of 7,135 feet. It is located in a valley with an east-west orientation. Rising terrain closes this valley to the west. This terrain constrains instrument approaches, and instrument and nighttime departures.

One publicly-available instrument approach procedure currently exists. This Global Positioning System (GPS)-based approach has a ceiling of 1,283 feet above ground level and forward visibility of 1.25 miles for aircraft with slower approach speeds. For aircraft with higher approach speeds, such as the CRJ-700, the ceiling is 1,283 feet with a three-mile forward visibility requirement. The ceiling establishes the lowest cloud height for which the approach can be used. The forward visibility requirement defines the minimum forward visibility that must exist for the approach to be used. Alaska Airlines' new Required Navigation Performance (RNP) instrument approaches lowered ceiling minimums from 1,283 feet for both runways to 250 feet for Runway 27 and 265 feet for Runway 9. These ceiling minimums are almost as low as ceilings that would be obtained with an Instrument Landing System (ILS) and a full approach lighting system. Currently, the RNP approaches are available only to Alaska Airlines.

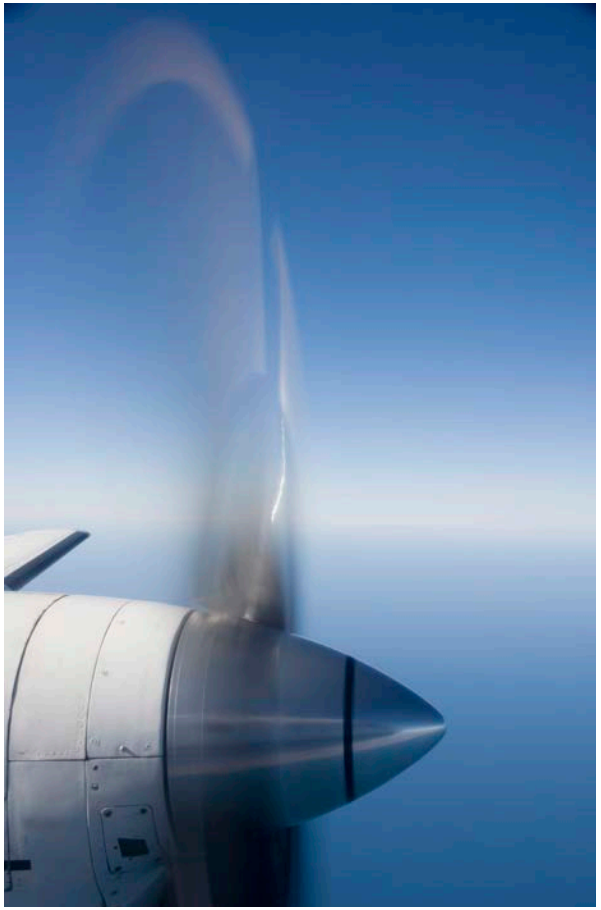
The RNP approaches have minimums that are about as low as possible with current technology. The chief constraint is that the approaches are proprietary and only available to Alaska Airlines. If these approaches were available to all aircraft, it would reduce the frequency of canceled flights by other airlines. If the approaches were made public, it is expected that they would be usable by newer commercial service aircraft.

## Weather

Summers in the Eastern Sierra are warm with a mean maximum temperature of 82 degrees Fahrenheit in the hottest month (July). Summers are generally free of rain, although thunderstorms do occasionally occur. Average maximum temperatures during winter months are 40 degrees Fahrenheit. While snow may fall in the mountains west of MMH from October through June, the heaviest snowfall occurs December through March. There is a sharp gradient in the amount of snowfall that occurs between the mountains and MMH. Due to its lower elevation and the rain shadow effect[1] of the peaks, there is substantially less snowfall at MMH. Visual meteorological conditions are common throughout the year. Reduced visibility and low ceilings are commonly associated with snow storms. During heavy snows, MMH visibility and ceilings may fall below the minimums for the published instrument approach procedures. When this occurs, MMH is effectively closed.

The RNP approaches mentioned in the *Geography* subsection provide instrument approach minimums about as low as possible with current technology. If the RNP approaches were made available to all aircraft, it would reduce the number of canceled airline flights. This would affect all commercial service aircraft equally. However, even with the best possible approaches, it is anticipated that MMH will be periodically closed during heavy snow storms.

[1] An area having relatively little precipitation due to the effect of a topographic barrier, especially a mountain range, that causes the prevailing winds to lose their moisture on the windward side, causing the leeward side to be dry.



## Environmental

There are several sources of environmental data currently available. The most recent were biological assessments associated with introduction of turboprop and jet airline service and construction of a wildlife exclusion fence around MMH. These were supplemented with an Information, Planning, and Consultation System (IPaC) Trust Resources report generated by the US Fish and Wildlife Service's IPaC website. This IPaC report and biological assessments identified amphibian, fish, bird and mammal species of concern existing in the vicinity of MMH. Critical habitat for one of the fish (Owens Tui chub) is located north of MMH. Critical habitat for the Sierra Nevada big horn sheep is located in the mountains west and north of MMH. The IPaC report also identified 22 migratory birds that may be present in the area during at least part of the year.

The National Wetlands Inventory website identified a number of jurisdictional wetlands in MMH's vicinity. Those closest to MMH are classified as freshwater emergent wetlands. One wetland area is located immediately beyond the east end of the runway. Wetlands classified as both freshwater emergent and riverine are located more distant from MMH.

In California, noise impacts are commonly quantified based upon the Community Noise Equivalent Level (CNEL). CNEL is a weighted average of noise level over time. It is typically presented graphically as contours of equal noise level.

The federal threshold for significant noise impacts to residential uses is 65 decibel (dB) CNEL. The most recent noise contours available were prepared in 2010 for MMH to support evaluation of the introduction of regional jet service by United Airlines. The 65 CNEL noise contour produced for this assessment does not leave MMH property. The only potentially sensitive human use in the vicinity is the Green Church. However, the church building is currently not occupied and is used solely for storage. Potential noise impacts on two animal species, Sierra Nevada big horn sheep and sage-grouse, have been identified as concerns.

None of these biological resources directly restrict the types of aircraft that can use MMH. However, impacts associated with facilities designed to accommodate specific aircraft or the noise generated by these aircraft could have impacts that would limit their ability to use MMH. Available data suggests that the most likely source of constraints would be impacts to wetlands or chub fish due to changes in storm-water drainage or noise impacts on the sage-grouse or big horn sheep. It is likely that impacts associated with storm-water drainage can be avoided through standard drainage management facilities. Noise impacts would be more complicated to mitigate because they would require FAA and airline concurrence on modifying flight tracks or flight profiles.

# 4 Existing Air Service

The section evaluates existing air service at MMH. An overview of historical, current and future scheduled airline service including seats, passengers, load factor and departures is provided as well as top origin and destination markets, fares and revenue. This section also compares MMH's performance with other airports served by MMH's incumbent airlines.

## Scheduled Airline Service

**Table 4.1** provides MMH's departures by month for the year ended March 31, 2017. Scheduled commercial service was provided by two airlines, Alaska Airlines and United Airlines to three hubs during the 12-month period. Los Angeles service was provided year round while the San Diego and San Francisco services were provided seasonally. Peak departures occurred in the winter season from December through March, peaking at 98 monthly departures and 7,262 monthly outbound seats. Alaska's flights to Los Angeles and San Diego were provided on 76-seat Bombardier Q400 turboprop aircraft while United's flights were operated with the Bombardier CRJ-700 aircraft.

**TABLE 4.1 MMH Airline Service - Departures/Seats**

| | | 2016 | | | | | | | | 2017 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Destination** | **Airline** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** |
| **Los Angeles, CA** | Alaska Airlines | 23 | 18 | 28 | 31 | 31 | 19 | 18 | 25 | 44 | 49 | 44 | 49 |
| **San Diego, CA** | Alaska Airlines | 3 | | | | | | | | 17 | 15 | 16 | 18 |
| **San Francisco, CA** | United Airlines | 3 | | | | | | | | 16 | 31 | 28 | 31 |
| **Total Flights Per Month** | | **29** | **18** | **28** | **31** | **31** | **19** | **18** | **25** | **77** | **95** | **88** | **98** |
| **Total Seats Per Month** | | **2,186** | **1,368** | **2,128** | **2,356** | **2,356** | **1,444** | **1,368** | **1,900** | **5,756** | **7,034** | **6,520** | **7,262** |

*SOURCE: Diio Mi; Scheduled seats and departures*

Since the year ended March 31, 2016, flights and seats decreased 9 percent. The decrease occurred in each of the markets with an 8 percent decrease at Los Angeles, 4 percent decrease at San Diego and 5 percent decrease at San Francisco in flights and seats. Service reductions have occurred primarily to maximize the value of the revenue guarantee provided to the air carriers. Service to Denver and Las Vegas also ceased in the prior year.

Looking forward to the year ended March 31, 2018 (as of November 11, 2017, subject to change), the schedule shows flights increasing 6 percent and seats increasing 7 percent. Seats to Los Angeles are scheduled to increase by 7 percent and San Diego by 17 percent. However, San Francisco available seats are scheduled to be reduced by 4 percent by United. The seasonal San Diego service is scheduled to operate 81 days for year ended March 31, 2018, compared to 69 days for the year ended March 31, 2017. The seasonal San Francisco service is scheduled to operate 104 days for the year ended March 31, 2018, compared to 109 days for the same period in the prior year.

**Table 4.2** shows annual scheduled airline service for the year ended March 31, 2008, through the year ended March 31, 2017. Historically, MMH had service to Denver, Las Vegas, Orange County, Reno and San Jose. The highest scheduled departures and seats occurred for the year ended March 31, 2014, at 827 and 60,594, respectively. Since then, flights have declined by 33 percent and seats by 31 percent.

*"Since the year ended March 31, 2016, flights and seats decreased 9 percent. However, looking forward to the year ended March 31, 2018, flights are scheduled to increase 6 percent and seats 7 percent."*

**TABLE 4.2 MMH Historical Scheduled Airline Service**

| | | Scheduled Flights - Year Ended March 31 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Destination** | **Airline** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** |
| **Denver, CO** | United Airlines | | | | | | | | 10 | 9 | |
| **Las Vegas, NV** | Alaska Airlines | | | | | | | | 22 | 2 | |
| **Los Angeles, CA** | Alaska Airlines | | 104 | 222 | 482 | 498 | 436 | 457 | 439 | 412 | 379 |
| **Orange County, CA** | United Airlines | | | | | 15 | 68 | 68 | 3 | | |
| **Reno, NV** | Alaska Airlines | | | 105 | 11 | | | | | | |
| **San Diego, CA** | Alaska Airlines | | | | | | | 103 | 80 | 72 | 69 |
| | United Airlines | | | | | 27 | 118 | 14 | | | |
| **San Francisco, CA** | United Airlines | | | | 106 | 66 | 186 | 185 | 165 | 115 | 109 |
| **San Jose, CA** | Alaska Airlines | | | 105 | 117 | 86 | 9 | | | | |
| **Total Flights** | | **0** | **104** | **432** | **716** | **692** | **817** | **827** | **719** | **610** | **557** |
| **Total Seats** | | **0** | **7,696** | **32,808** | **53,356** | **51,512** | **58,372** | **60,594** | **53,576** | **45,616** | **41,678** |

*SOURCE: Diio Mi; Scheduled seats and departures*

## Load Factor, Available Seats and Passengers

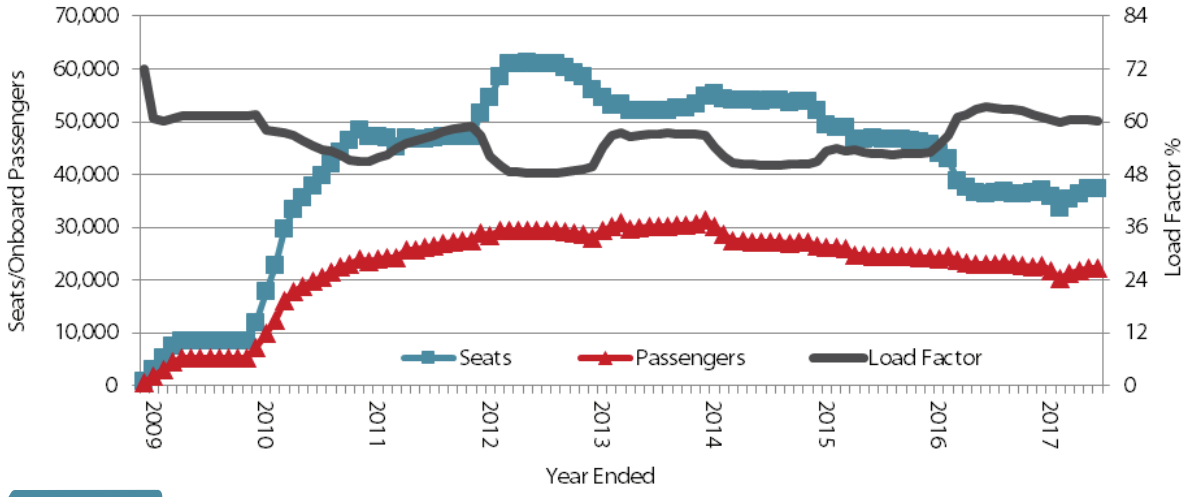
**Exhibit 4.1** shows MMH's available seats, onboard passengers and load factors for arrivals and departures on a 12-month ended basis to show the fluctuations over time since service initiation in late 2008. MMH's load factor has typically averaged less than 60 percent but has improved in 2016/2017, generally averaging 60 to 63 percent. Seats reached a peak in 2012 and have continued to decline through 2017.

**Table 4.3**, next page, provides a review of departures, seats and load factor by market for each nonstop destination and carrier for the last 12 calendar quarters. Load factors ranged from 45 to 66 percent on average by quarter over the last 12 quarters, reaching a high in the first quarter of 2016 and 2017 and a low in the second quarter 2015.

**On an airline-by-airline basis:**

- **Alaska Airlines:** From the third quarter 2014 through the second quarter 2017, Alaska served three nonstop markets including Las Vegas, Los Angeles and San Diego. Las Vegas was only served in the first quarter of 2015 with 20 departures. The load factor was low at 24 percent. San Diego was served seasonally, primarily in the first and fourth quarters of each year. Load factors in the 2015/2016 winter season averaged 71 percent while loads for the 2016/2017 winter season averaged 64 percent. Los Angeles was served year round, with year-over-year loads also declining in 2017.
- **United Airlines:** United served Denver and San Francisco seasonally during the 12-quarter period. Denver service was limited with six to seven departures in the first quarter of 2015 and 2016. United did not serve Denver in 2017. With the limited service, load factors were low at 22 to 30 percent. San Francisco service for the 2016/2017 winter season generally improved on a load factor basis, averaging 56 percent, compared to 55 percent for the 2015/2016 winter season.

**EXHIBIT 4.1 Load Factor, Available Seats and Onboard Passengers**




SOURCE: Diio Mi

**TABLE 4.3 Departures, Load Factor and Seats by Market and Calendar Quarter**

| | | | 2014 | | 2015 | | | 2016 | | | | 2017 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Airline** | **Destination** | **Data Item** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** |
| **Alaska Airlines** | **Las Vegas, NV** | Departures | | | 20 | | | | | | | | | |
| | | Seats | | | 1,520 | | | | | | | | | |
| | | Load Factor | | | 24 | | | | | | | | | |
| | **Los Angeles, CA** | Departures | 82 | 81 | 148 | 90 | 78 | 76 | 121 | 62 | 78 | 74 | 106 | 82 |
| | | Seats | 6,232 | 6,156 | 11,248 | 6,802 | 5,928 | 5,776 | 9,196 | 4,712 | 5,928 | 5,624 | 8,056 | 6,194 |
| | | Load Factor | 62 | 59 | 59 | 46 | 62 | 61 | 75 | 55 | 59 | 53 | 69 | 55 |
| | **San Diego, CA** | Departures | | 14 | 50 | 3 | | 9 | 46 | 3 | | 14 | 37 | 8 |
| | | Seats | | 1,064 | 3,762 | 228 | | 684 | 3,458 | 228 | | 1,064 | 2,774 | 608 |
| | | Load Factor | | 55 | 57 | 45 | | 77 | 70 | 61 | | 59 | 66 | 61 |
| **United Airlines** | **Denver, CO** | Departures | | | 7 | | | | 6 | | | | | |
| | | Seats | | | 490 | | | | 420 | | | | | |
| | | Load Factor | | | 30 | | | | 22 | | | | | |
| | **San Francisco, CA** | Departures | | 12 | 115 | 7 | | 10 | 72 | 3 | | 14 | 61 | 3 |
| | | Seats | | 840 | 8,050 | 490 | | 700 | 5,005 | 210 | | 980 | 4,235 | 210 |
| | | Load Factor | | 59 | 40 | 36 | | 55 | 55 | 43 | | 58 | 56 | 42 |
| | **Total** | **Departures** | **82** | **107** | **340** | **100** | **78** | **95** | **244** | **68** | **78** | **102** | **203** | **93** |
| | | **Seats** | **6,232** | **8,060** | **25,070** | **7,520** | **5,928** | **7,160** | **18,079** | **5,150** | **5,928** | **7,668** | **15,065** | **7,012** |
| | | **Load Factor** | **62** | **59** | **51** | **45** | **62** | **63** | **66** | **55** | **59** | **55** | **66** | **55** |
| | | **Seats/dept** | **76** | **75** | **74** | **76** | **76** | **75** | **74** | **76** | **76** | **75** | **74** | **76** |

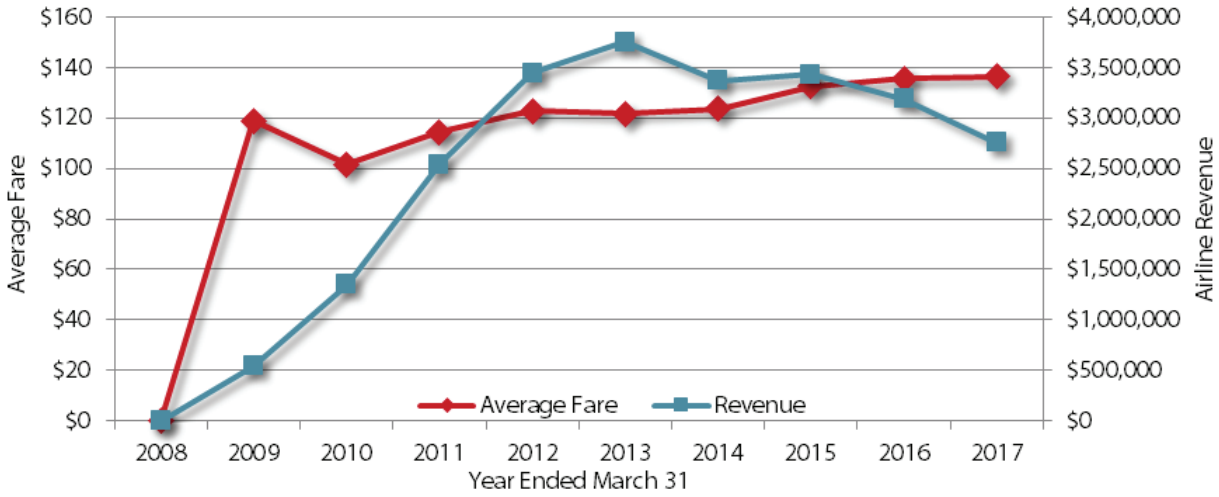
*SOURCE: Diio Mi*

## Revenue and Fare Trends

**Exhibit 4.2** shows the trend from 2008 through 2017 for the year ended March 31 for MMH's origin and destination revenue and fares. Over the 10-year period MMH's airline passenger revenue continued to climb from service initiation, reaching the peak in revenue in 2013. Since then, revenue has declined nearly every year. From the year ended March 31, 2013, origin and destination revenue declined 27 percent.

The average fare has followed a different trend, generally increasing every year since service initiation. Fares reached a one-way fare peak for the year ended March 31, 2017, at $136. This represents a 12 percent increase over 2013 and a 34 percent increase over the average fare low in 2010 of $102 one-way. Nationally, average fares have been trending the opposite direction, with average US airfares declining 11 percent since 2013.

**EXHIBIT 4.2 MMH Revenue and Average Fare Trends**




SOURCE: Diio Mi

## Top 25 Origin and Destination Markets

**Table 4.4** shows MMH's top 25 origin and destination markets for the year ended March 31, 2017. MMH served 40,378 origin and destination passengers, generating $5.5 million in origin and destination airline revenue. The net change from 2016 to 2017 was a 14 percent decrease in MMH passengers on a 13 percent decrease in seats. With a 1 percent average fare increase year-over-year, total MMH passenger revenue decreased 14 percent. The top five airport destinations included Los Angeles, San Diego, San Francisco, Seattle and Portland, three of which had nonstop service. The largest market without nonstop service was Seattle followed by Portland, both representing Alaska hub markets that connect well over their existing MMH service. Most markets experienced year-over-year passenger decreases; however, several markets such as Portland, Newark, Chicago-O'Hare, New York-Kennedy and Baltimore had notable passenger increases.

Overall 29 percent of passengers on MMH flights originated from MMH demonstrating the leisure-based market, but there are significant variances by destination. Four top 25 markets had a percent origin of 50 percent or greater from MMH, including Denver, Phoenix, Vancouver and Orlando. Conversely, several markets had percent origin of less than 15 percent, including Boston, Houston, Dallas-Fort Worth, Washington-Dulles and Austin. Low percent origin typically indicates a higher percentage of leisure traffic from that market.

**TABLE 4.4 MMH Top 25 Origin and Destination Passenger Markets**

| | | YE 1Q 2017 | | | | % Change vs 2016 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Rank | Airport | O&D Pax | % Origin MMH | O&D Rev ($) | Fare ($) | Pax | Rev | Fare | Seats |
| 1 | Los Angeles, CA | 23,273 | 29 | 2,261,323 | 97 | (10) | (9) | 1 | (12) |
| 2 | San Diego, CA | 5,531 | 17 | 554,141 | 100 | (20) | (11) | 11 | (7) |
| 3 | San Francisco, CA | 3,209 | 19 | 416,336 | 130 | (13) | (3) | 12 | (12) |
| 4 | Seattle, WA (SEA) | 1,377 | 20 | 213,617 | 155 | (16) | (17) | (0) | - |
| 5 | Portland, OR | 575 | 21 | 83,817 | 146 | 11 | (13) | (21) | - |
| 6 | Newark, NJ | 453 | 21 | 155,374 | 343 | 67 | 77 | 6 | - |
| 7 | Chicago, IL (ORD) | 346 | 28 | 99,478 | 288 | 25 | 54 | 23 | - |
| 8 | Denver, CO | 293 | 51 | 73,112 | 249 | (56) | (48) | 16 | - |
| 9 | New York, NY (JFK) | 286 | 21 | 79,927 | 280 | 4 | (33) | (35) | - |
| 10 | Boston, MA | 277 | 14 | 96,071 | 346 | (51) | (39) | 25 | - |
| 11 | Baltimore, MD | 267 | 37 | 70,208 | 263 | 100+ | 100+ | (13) | - |
| 12 | Washington, DC (DCA) | 207 | 20 | 51,166 | 248 | (30) | (20) | 14 | - |
| 13 | Anchorage, AK | 194 | 39 | 44,306 | 229 | 1 | (29) | (30) | - |
| 14 | Atlanta, GA | 179 | 22 | 62,625 | 350 | (33) | (33) | 0 | - |
| 15 | Houston, TX (IAH) | 157 | 0 | 37,647 | 240 | 8 | (15) | (21) | - |
| 16 | Phoenix, AZ (PHX) | 154 | 51 | 32,036 | 208 | (32) | (28) | 7 | - |
| 17 | Dallas, TX (DFW) | 150 | 0 | 53,328 | 355 | (61) | (39) | 54 | - |
| 18 | Miami, FL | 114 | 17 | 34,317 | 302 | 29 | 45 | 13 | - |
| 19 | Mexico City, Mexico | 93 | 29 | 24,313 | 261 | (57) | (55) | 4 | - |
| 20 | Vancouver, Canada | 91 | 56 | 21,363 | 234 | (56) | (54) | 4 | - |
| 21 | Minneapolis, MN | 90 | 22 | 42,790 | 478 | (31) | 22 | 76 | - |
| 22 | Lima, Peru | 86 | 16 | 33,732 | 391 | 100+ | 100+ | 100+ | - |
| 23 | Orlando, FL (MCO) | 85 | 77 | 20,931 | 247 | 11 | 1 | (9) | - |
| 24 | Washington, DC (IAD) | 80 | 13 | 20,362 | 255 | (55) | (57) | (5) | - |
| 25 | Austin, TX | 80 | 0 | 28,031 | 352 | 13 | 81 | 59 | - |
| **All MMH Markets** | | **40,378** | **29** | **5,505,380** | **136** | **(14)** | **(14)** | **1** | **(13)** |

*SOURCE: Diio Mi*

**Table 4.5** shows the breakdown of passengers and revenue for the top 25 MMH markets by airline for the year ended March 31, 2017. Alaska Airlines led the market share in passengers and revenue, with shares of 78 and 61 percent, respectively. Alaska's share does not include the codeshare passengers on American Airlines or Delta Air Lines. If American and Delta were included, Alaska's share would increase to 82 percent for passengers and 71 percent for revenue. United Airlines followed with a 17 percent passenger share and 26 percent revenue share. United's revenue share was higher than its passenger share in large part due to the higher fare charged by United. United's average fare was $216 compared to a one-way average of $106 for Alaska.

> *"Alaska Airlines led the market share in passengers and revenue, with shares of 78 and 61 percent, respectively. United Airlines followed with a 17 percent passenger share and 26 percent revenue share."*

**TABLE 4.5 MMH Top 25 Origin and Destination Markets by Airline (YE 1Q 2017)**

| | | O&D Passengers | | Revenue ($) | | Average Fare ($) | |
|---|---|---|---|---|---|---|---|
| Rank | Airport | AS | UA | AS | UA | AS | UA |
| 1 | Los Angeles, CA | 22,980 | 263 | 2,210,856 | 45,400 | 96 | 172 |
| 2 | San Diego, CA | 5,357 | 147 | 530,046 | 17,305 | 99 | 118 |
| 3 | San Francisco, CA | 0 | 3,209 | 0 | 416,336 | 0 | 130 |
| 4 | Seattle, WA (SEA) | 1,212 | 156 | 183,348 | 27,974 | 151 | 179 |
| 5 | Portland, OR | 431 | 145 | 57,460 | 26,357 | 133 | 182 |
| 6 | Newark, NJ | 40 | 413 | 8,049 | 147,325 | 203 | 357 |
| 7 | Chicago, IL (ORD) | 29 | 296 | 8,704 | 83,467 | 300 | 282 |
| 8 | Denver, CO | 82 | 183 | 17,955 | 48,368 | 220 | 264 |
| 9 | New York, NY (JFK) | 155 | 0 | 35,064 | 0 | 226 | 0 |
| 10 | Boston, MA | 11 | 188 | 2,927 | 67,599 | 271 | 360 |
| 11 | Baltimore, MD | 218 | 19 | 48,742 | 10,205 | 223 | 534 |
| 12 | Washington, DC (DCA) | 148 | 48 | 35,544 | 11,686 | 240 | 243 |
| 13 | Anchorage, AK | 194 | 0 | 44,306 | 0 | 229 | 0 |
| 14 | Atlanta, GA | 20 | 28 | 5,476 | 7,897 | 272 | 283 |
| 15 | Houston, TX (IAH) | 0 | 157 | 0 | 37,647 | 0 | 240 |
| 16 | Phoenix, AZ (PHX) | 38 | 76 | 9,956 | 14,509 | 261 | 191 |
| 17 | Dallas, TX (DFW) | 10 | 0 | 2,092 | 0 | 209 | 0 |
| 18 | Miami, FL | 0 | 18 | 0 | 6,512 | 0 | 358 |
| 19 | Mexico City, Mexico | 10 | 9 | 2,560 | 2,291 | 253 | 249 |
| 20 | Vancouver, Canada | 53 | 9 | 14,762 | 1,683 | 277 | 187 |
| 21 | Minneapolis, MN | 10 | 20 | 13,147 | 6,544 | 1,328 | 331 |
| 22 | Lima, Peru | 0 | 19 | 0 | 9,744 | 0 | 504 |
| 23 | Orlando, FL (MCO) | 0 | 85 | 0 | 20,931 | 0 | 247 |
| 24 | Washington, DC (IAD) | 0 | 80 | 0 | 20,362 | 0 | 255 |
| 25 | Austin, TX | 10 | 40 | 2,455 | 17,939 | 248 | 453 |
| **All Markets** | | **31,621** | **6,679** | **3,355,101** | **1,440,156** | **106** | **216** |
| **Market Share** | | **78** | **17** | **61** | **26** | **-** | **-** |

*SOURCE: Diio Mi; NOTE: AS = Alaska Airlines, UA = United Airlines; Share does not equal 100% due to codeshare flying on other airlines.*

## Market Performance Comparisons

This sub-section compares MMH's performance with other airports served by MMH's incumbent airlines. These comparisons are important from an airline and community standpoint and should be monitored regularly.

Airline planners review various indicators, including: passengers, revenue, fare, yield, revenue per available seat mile (RASM) and load factors. RASM is the unit revenue (i.e., revenue divided by available seat miles) generated and is a key indicator to understanding and comparing performance of multiple stations/markets. A comparison of other ski destination markets by airline is provided to examine how MMH is performing in each airline's system.

The following ski destinations are included in the comparison (shown in **Exhibit 4.3**):

- Aspen-Pitkin County Airport (ASE) – Aspen, CO
- Eagle County Regional Airport (EGE) – Vail, CO
- Friedman Memorial Airport (SUN) – Sun Valley, ID
- Gunnison-Crested Butte Regional Airport (GUC) – Gunnison, CO
- Jackson Hole Airport (JAC) – Jackson Hole, WY
- Montrose Regional Airport (MTJ) – Montrose, CO
- Yampa Valley Regional Airport (HDN) – Steamboat Springs, CO

**EXHIBIT 4.3 Ski Destination Markets**

## Alaska Airlines

For the year ended March 31, 2017, Alaska provided MMH nonstop service to Los Angeles (year round) and San Diego (seasonally) with the Bombardier Q400 turboprop aircraft. Los Angeles service was provided on a less-than-daily basis during the shoulder seasons and up to twice daily during peak seasons. San Diego service was provided two to four times weekly for the winter 2016/2017 ski season (December 15, 2016, to March 31, 2017).

**Table 4.6** provides a comparison of Alaska's (including Virgin America) seats, departures and load factor for the four ski destinations Alaska serves. MMH had 28,386 seats and 374 departures, representing the second highest seats and second highest departures out of Alaska's four ski destination markets. Seats and departures decreased over the prior year by 11 percent, and the load factor declined 2 percentage points. Comparatively, Alaska's ski destination seats and departures increased by 8 and 7 percent, respectively. MMH's load factor was 5 percentage points lower than Alaska's average for ski destinations.

**TABLE 4.6 Alaska Airlines - Comparison of Seats, Departures and Load Factor (non-directional)**

| | | YE 1Q 2017 | | | | Change YOY | | |
|---|---|---|---|---|---|---|---|---|
| Rank | Airport | Seats | Depart-ures | Seats/ Dept | Load Factor % | Seats % | Depart-ures % | Load Factor |
| 1 | Sun Valley, ID | 33,668 | 443 | 76 | 71 | 20 | 20 | (2) |
| **2** | **Mammoth Lakes, CA** | **28,386** | **374** | **76** | **61** | **(11)** | **(11)** | **(2)** |
| 3 | Steamboat Springs, CO | 6,460 | 85 | 76 | 55 | 64 | 49 | (2) |
| 4 | Gunnison, CO | 1,976 | 26 | 76 | 54 | 53 | 53 | 9 |
| **Total Ski Destinations** | | **70,490** | **928** | **76** | **66** | **8** | **7** | **(2)** |
| **All AS domestic markets** | | **26,363,984** | **210,796** | **125** | **84** | **6** | **4** | **1** |

SOURCE: Diio Mi

**TABLE 4.7 Alaska Airlines - Comparison of Passengers, Revenue, Fare and Yield**

| | | YE 1Q 2017 | | | | | % Change YOY | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Airport | O&D Pax | O&D Rev ($) | Fare ($) | Yield (cents) | Itin Miles | Pax | Rev | Fare | Yield |
| 1 | Sun Valley, ID | 47,164 | 6,414,083 | 136 | 22.3 | 610 | 12 | 3 | (8) | (6) |
| **2** | **Mammoth Lakes, CA** | **31,621** | **3,355,101** | **106** | **29.0** | **366** | **(10)** | **(7)** | **4** | **(3)** |
| 3 | Steamboat Springs, CO | 6,920 | 1,005,343 | 145 | 15.6 | 932 | 48 | 38 | (7) | 4 |
| 4 | Gunnison, CO | 2,102 | 310,227 | 148 | 17.4 | 847 | (4) | (10) | (7) | (7) |
| **Total Ski Destinations** | | **87,808** | **11,084,754** | **126** | **22.8** | **552** | **4** | **2** | **(2)** | **(6)** |
| **All AS domestic markets** | | **34,307,372** | **5,785,747,824** | **169** | **12.4** | **1,357** | **8** | **3** | **(5)** | **(6)** |

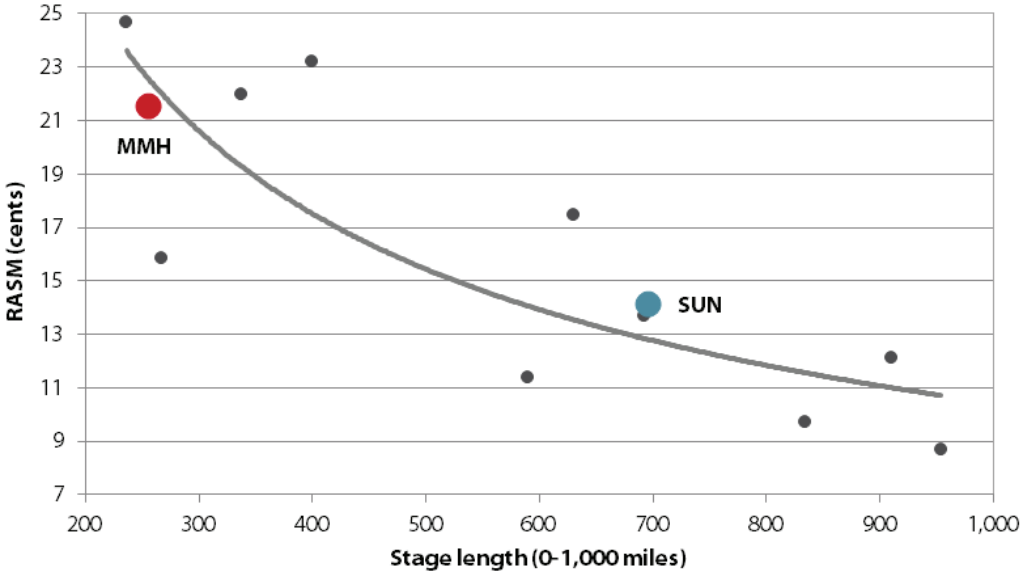
SOURCE: Diio Mi

**Table 4.7** provides a comparison of passengers, revenue, fare and yield in Alaska's comparable markets. MMH ranked second in passengers and revenue out of the four ski destination markets. At 16 percent below the ski destination average, MMH had the lowest average fare of the four markets. Despite the low fare, MMH had the highest average yield (27 percent higher than the ski destination average at an average itinerary stage length 34 percent below the system average). The yield variance is due in large part to the skewing of the traffic to the local, destination airport and not connecting beyond to other destinations. Compared to the prior year, passengers decreased 10 percent while Alaska's ski destination passengers improved 4 percent. MMH's Alaska revenue decreased 7 percent while Alaska's ski destination revenue increased 2 percent. The average fare in the MMH market increased 4 percent while the ski destination average decreased 2 percent, but MMH's overall average fare was lower than Alaska's ski destination average.

**Exhibit 4.4** provides MMH's RASM plotted against other markets served by Alaska at Los Angeles (under 1,000 miles). MMH had the second shortest stage length to/ from Los Angeles at 256 miles compared to all markets served by Alaska. On a RASM basis, MMH performed well at Alaska's average at Los Angeles for the year ended March 31, 2017. MMH had a RASM of 21.53 cents. This is a 3 percent decrease over year ended March 31, 2016, when MMH's RASM was 22.08 cents. With an average load factor of 60 percent, MMH's load factor was 25 percentage points lower than Alaska's average at Los Angeles of 85 percent. Only one other ski destination was served by Alaska within the 1,000-mile stage length identified in **Exhibit 4.4**, SUN in Sun Valley, Idaho. SUN performed above Alaska's Los Angeles average on a RASM basis but below average on a load factor basis at 68 percent.

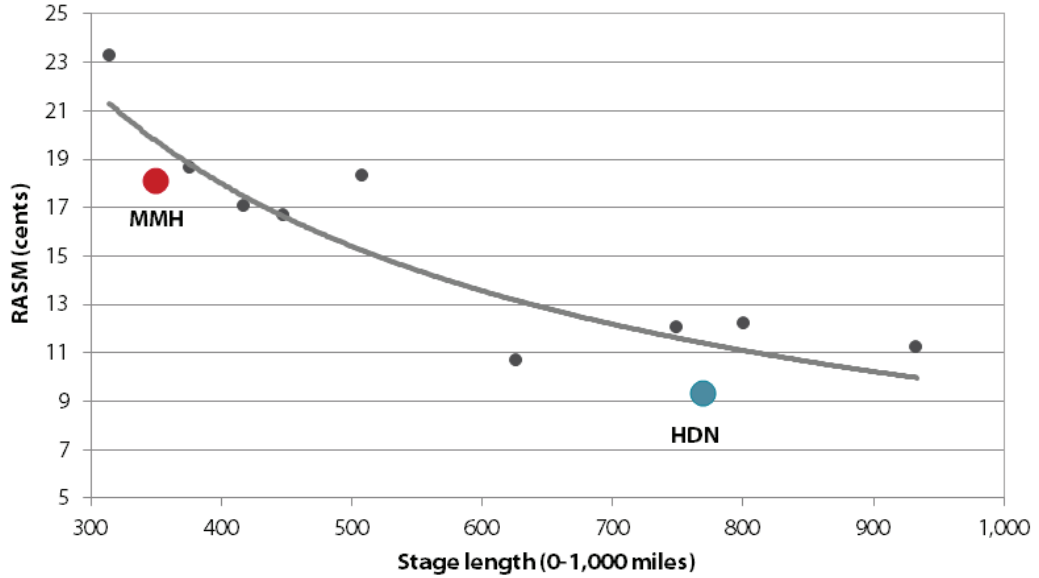
**Exhibit 4.5** provides MMH's RASM plotted against other markets served by Alaska at San Diego for the first quarter of 2017 (under 1,000 miles). On a RASM basis, MMH performed slightly below average for Alaska at San Diego. MMH had a RASM of 18.1 cents at a stage length of 350 miles. This is a 3 percent increase over year ended March 31, 2016, when MMH's RASM was 17.6 cents. With an average load factor of 81 percent, MMH's load factor was 14 percentage points lower than Alaska's average at San Diego of 89 percent. Only one other ski destination was served by Alaska within the 1,000-mile stage length identified in **Exhibit 4.5**, HDN in Steamboat Springs, Colorado. HDN performed below Alaska's San Diego average on a RASM basis and below average on a load factor basis at 52 percent.

**EXHIBIT 4.4 Alaska Airlines Los Angeles RASM Performance (Year Ended March 31, 2017)**




*SOURCE: Diio Mi; NOTE: Includes markets up to 1,000 miles*

**EXHIBIT 4.5 Alaska Airlines San Diego RASM Performance (Quarter Ended March 31, 2017)**




*SOURCE: Diio Mi; NOTE: Includes markets up to 1,000 miles*

## United Airlines

For the year ended March 31, 2017, United provided MMH nonstop service to San Francisco on a seasonal basis during the winter 2016/2017 season (December 16, 2016, to March 31, 2017). United operated once daily flights to San Francisco with 70-seat regional jets.

**Table 4.8** provides a comparison of United's seats, departures and load factor for the first quarter of 2017 for the ski destination markets. MMH had 4,235 seats and 61 departures, representing the eighth highest ski market destination in terms of seats and departures out of the eight identified markets. Seats and departures decreased over the prior year by 22 percent. With the substantial decrease in capacity, the load factor increased 10 percentage points. Comparatively, United's seats for ski destinations decreased 6 percent while departures decreased 8 percent. MMH's load factor was 13 percentage points lower than United's average for ski destinations.

**Table 4.9** provides a comparison of passengers, revenue, fare and yield in United's comparable markets. MMH ranked eighth in passengers and revenue of the eight ski destination markets. At 24 percent below the ski destination average, MMH had the lowest average fare of the eight markets. However, MMH had the highest average yield at 16 percent higher than the ski destination average at an average itinerary stage length 34 percent below the average. Compared to the prior year, passengers decreased 15 percent while United's ski destination passengers decreased 7 percent. MMH's United revenue increased 6 percent while United's ski destination revenue decreased 3 percent. The average fare in the MMH market increased 24 percent, while United's ski destination average increased 5 percent.

**TABLE 4.8 United Airlines - Comparison of Seats, Departures and Load Factor (non-directional)**

| | | 1Q 2017 | | | | Change YOY | | |
|---|---|---|---|---|---|---|---|---|
| Rank | Airport | Seats | Depart-ures | Seats/ Dept | Load Factor % | Seats % | Depart-ures % | Load Factor |
| 1 | Aspen, CO | 109,952 | 1,572 | 70 | 69 | (10) | (10) | (2) |
| 2 | Jackson Hole, WY | 61,767 | 573 | 108 | 72 | (2) | (7) | 1 |
| 3 | Montrose, CO | 44,045 | 549 | 80 | 67 | 10 | (8) | (10) |
| 4 | Vail/Eagle, CO | 39,598 | 429 | 92 | 71 | 0 | (2) | (2) |
| 5 | Steamboat Springs, CO | 37,624 | 473 | 80 | 67 | (18) | (12) | (2) |
| 6 | Gunnison, CO | 8,181 | 146 | 56 | 67 | 3 | 3 | (3) |
| 7 | Sun Valley, ID | 7,416 | 106 | 70 | 65 | 1 | 1 | 3 |
| **8** | **Mammoth Lakes, CA** | **4,235** | **61** | **70** | **56** | **(22)** | **(22)** | **10** |
| **Total Ski Destinations** | | **312,817** | **3,908** | **80** | **69** | **(6)** | **(8)** | **(2)** |
| **All UA domestic markets** | | **20,525,517** | **185,442** | **111** | **80** | **3** | **(2)** | **(0)** |

SOURCE: Diio Mi

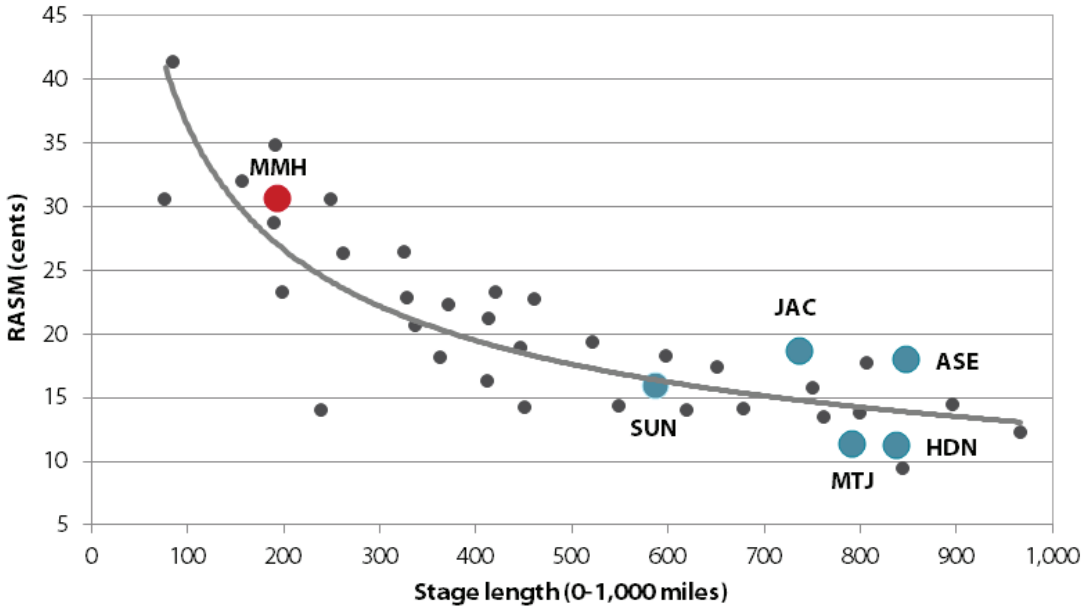
**TABLE 4.9 United Airlines - Comparison of Passengers, Revenue, Fare and Yield**

| | | 1Q 2017 | | | | | % Change YOY | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Airport | O&D Pax | O&D Rev ($) | Fare ($) | Yield (cents) | Itin Miles | Pax | Rev | Fare | Yield |
| 1 | Aspen, CO | 134,746 | 39,608,929 | 294 | 21.4 | 1,376 | (13) | (7) | 6 | 2 |
| 2 | Jackson Hole, WY | 84,066 | 24,097,149 | 287 | 19.2 | 1,492 | 2 | 8 | 6 | 3 |
| 3 | Montrose, CO | 55,398 | 14,519,373 | 262 | 19.9 | 1,319 | (4) | (7) | (3) | 1 |
| 4 | Vail/Eagle, CO | 54,950 | 16,962,179 | 309 | 20.5 | 1,504 | (2) | 1 | 3 | (3) |
| 5 | Steamboat Springs, CO | 53,306 | 12,990,014 | 244 | 18.3 | 1,333 | (14) | (9) | 7 | 3 |
| 6 | Gunnison, CO | 11,734 | 2,834,780 | 242 | 20.7 | 1,169 | (9) | (5) | 4 | 4 |
| 7 | Sun Valley, ID | 11,293 | 2,622,573 | 232 | 18.6 | 1,250 | 33 | 26 | (5) | (8) |
| **8** | **Mammoth Lakes, CA** | **4,748** | **1,006,930** | **212** | **23.4** | **908** | **(15)** | **6** | **24** | **3** |
| **Total Ski Destinations** | | **410,242** | **114,641,928** | **279** | **20.2** | **1,377** | **(7)** | **(3)** | **5** | **2** |
| **All UA domestic markets** | | **23,002,205** | **6,382,647,866** | **277** | **14.4** | **1,924** | **6** | **3** | **(2)** | **(0)** |

SOURCE: Diio Mi

**Exhibit 4.6** shows the RASM for markets served by United to San Francisco plotted against the stage length (under 1,000 miles) for the quarter ended March 31, 2017. MMH had a RASM of 30.7 cents at a stage length of 193 miles, above United's San Francisco average. This is an increase of 16 percent over the first quarter of 2016 when MMH's RASM was 26.5 cents. MMH's San Francisco load factor of 56 percent was 22 percentage points lower than United's system average of 78 percent at San Francisco. Compared to other ski destinations, MMH performed well on a RASM basis with similar above average results as JAC in Jackson Hole, WY, and ASE in Aspen, CO. The 56 percent load factor, however, was mixed in comparison to other ski destinations, lower than SUN (61 percent), JAC (70 percent) and ASE (69 percent) but higher than MTJ in Montrose, CO, (55 percent) and HDN (49 percent).

**EXHIBIT 4.6 United Airlines San Francisco RASM Performance (Quarter Ended March 31, 2017)**




*SOURCE: Diio Mi; NOTE: Includes markets up to 1,000 miles*

## Service Cancellation Comparisons

A primary concern for the Eastern Sierra region is the number of flight cancellations. Cancellations occur for many reasons, including weather, air traffic control, aircraft maintenance and crew availability. Cancellations vary significantly by hub and airline. In many cases, the cancellation stems from causes unrelated to the destination airport such as MMH. For example, in the summer and fall of 2017, Alaska Airlines canceled a record number of flights flown by Horizon Air due to pilot shortage issues.

To assess the severity of cancellations at MMH, a comparison by airline and by hub was completed. Where applicable, comparisons to other ski destinations were made. The winter season (i.e., December, January, February and March) is shown separately from the summer (June through August) for the year round Los Angeles service. **Table 4.10**, next page, provides a comparison of the percentage of flights completed by Alaska Airlines at their Los Angeles hub over the past five years. Comparison markets included any market served with Bombardier Q400 aircraft.

The winter completion rate for MMH averaged 75 percent for the winter 2016/2017 season. This is the lowest in the last five years with completion rates above 90 percent in three of the five years. MMH had the lowest completion rate of any airport served with Bombardier Q400 aircraft by Alaska at Los Angeles. SUN, a comparable ski market, had a completion rate of 86 percent; however, in the year prior the completion rate was 79 percent, similar to MMH's 2016/2017 rate. In the summer, completion rates are higher for all airports with less impact by inclement weather.

> *"Alaska's MMH-Los Angeles winter completion rate averaged 75 percent for the winter 2016/2017 season, the lowest in the last five years."*

**Table 4.11** provides the percentage of flights completed by Alaska at their San Diego hub. Similar to **Table 4.10**, markets with Bombardier Q400 operations were included for comparison.

Like the Los Angeles hub, MMH had the lowest completion percentage of the comparison airports. Comparisons to other ski destinations are limited as Alaska only provided service to HDN from San Diego. The San Diego completion rate for winter 2016/2017 was slightly higher than Los Angeles; however, like Los Angeles, the winter 2016/2017 season was the worst completion percentage over the past five years.

**Table 4.12**, next page, provides a comparison of completion percentages for United Airlines at San Francisco. The table includes comparisons to ski destinations that are served to San Francisco as well as other select markets operated with the CRJ-700.

While MMH still has one of the lowest completion rates of markets served to/from San Francisco with the CRJ-700, SUN had a lower rate in each of the past four years. ASE also had completion percentages below 90 percent.

Ski markets are not the only markets impacted by cancellations. The San Francisco hub is notorious for dealing with high cancellations, particularly to markets with service provided by smaller regional aircraft. When cancellations are necessary, it is more likely that a smaller passenger jet will endure a cancellation versus a larger jet that would impact a higher number of people. The Fresno market has been impacted significantly with completion

**TABLE 4.10 Alaska Airlines-Los Angeles Flight Completion Comparisons**

| | | Winter Flight Completion % | | | | |
|---|---|---|---|---|---|---|
| Rank | Airport | 2012/ 2013 | 2013/ 2014 | 2014/ 2015 | 2015/ 2016 | 2016/ 2017 |
| **1** | **Mammoth Lakes, CA** | **92** | **93** | **91** | **85** | **75** |
| **2** | Sun Valley, ID | 83 | 83 | 86 | 79 | 86 |
| **3** | Monterey, CA | - | - | - | 98 | 89 |
| **4** | Gunnison, CO | - | - | - | 57 | 90 |
| **5** | Santa Rosa, CA | 99 | 98 | 94 | 99 | 94 |
| **6** | Medford, OR | 98 | 88 | 99 | 98 | 95 |
| | **AS-LAX Hub Average** | **98** | **98** | **98** | **98** | **96** |

| | | Summer Flight Completion % | | | |
|---|---|---|---|---|---|
| Rank | Airport | 2013 | 2014 | 2015 | 2016 |
| **1** | **Mammoth Lakes, CA** | **93** | **93** | **91** | **96** |
| **2** | Sun Valley, ID | 94 | 98 | 98 | 99 |
| **3** | Monterey, CA | - | - | - | 98 |
| **4** | Santa Rosa, CA | 99 | 98 | 99 | 98 |
| **5** | Medford, OR | 100 | 97 | 100 | 99 |
| | **AS-LAX Hub Average** | **99** | **99** | **99** | **99** |

*SOURCE: Diio Mi; NOTE: T100 Departures Divided By Scheduled Departures; Includes all markets operated with Bombardier Q400 aircraft; 2017 summer data unavailable as of 11/13/17*

**TABLE 4.11 Alaska Airlines-San Diego Flight Completion Comparisons**

| | | Winter Flight Completion % | | | | |
|---|---|---|---|---|---|---|
| Rank | Airport | 2012/ 2013 | 2013/ 2014 | 2014/ 2015 | 2015/ 2016 | 2016/ 2017 |
| **1** | **Mammoth Lakes, CA** | **-** | **87** | **95** | **80** | **77** |
| **2** | Monterey, CA | 98 | 97 | 94 | 100 | 94 |
| **3** | Fresno, CA | 99 | 97 | 98 | 97 | 98 |
| **4** | Steamboat Springs, CO | - | - | - | - | 98 |
| **5** | Santa Rosa, CA | 98 | 98 | 99 | 98 | 98 |
| **6** | Boise, ID | - | 96 | 99 | 98 | 100 |
| | **AS-SAN Hub Average** | **99** | **98** | **99** | **98** | **97** |

*SOURCE: Diio Mi; NOTE: T100 Departures Divided By Scheduled Departures; Includes markets operated with Bombardier Q400 aircraft*

percentages in the low 80s. Other markets like Redding, CA, while on average is not as severe, have been impacted significantly on a month-by-month basis. With three roundtrips a day, Redding's San Francisco completion rate was only 76 percent in April 2017 and 83 to 84 percent in January and February 2017. *Section 8, Next Steps*, includes recommendations on potential remedies to MMH's low flight completion rate.

## Summary

While scheduled airline service decreased from 2016 to 2017 (year ended March 31), service is scheduled to increase for 2018 with overall air service trending positively. Alaska is scheduled to increase service somewhat to Los Angeles and San Diego while United is scheduled to decrease service.

Service performance is generally improving, with year-ended load factors in total averaging above 60 percent compared to less than 60 percent historically. Passengers and revenue peaked in 2013 with the peak in seats and has been declining since then. The top three markets are served nonstop with the next largest markets being Seattle and Portland, two top destination markets for additional MMH service.

In general, while MMH tends to be one of the smaller markets served by both Alaska and United, MMH performs average on a RASM basis, with RASMs averaging slightly below the Los Angeles and San Diego hub averages at one of the shortest stage lengths but above average at San Francisco. While the load factors are below the target load factors typically expected by the airlines, the RASM performance indicates market sustainability.

**TABLE 4.12 United Airlines-San Francisco Flight Completion Comparisons**

| | | Winter Flight Completion % | | | | |
|---|---|---|---|---|---|---|
| Rank | Airport | 2012/ 2013 | 2013/ 2014 | 2014/ 2015 | 2015/ 2016 | 2016/ 2017 |
| | **Ski Destinations** | | | | | |
| 1 | Sun Valley, ID | - | 78 | 84 | 73 | 60 |
| 2 | **Mammoth Lakes, CA** | **90** | **81** | **89** | **77** | **70** |
| 3 | Aspen, CO | 95 | 85 | 91 | 88 | 87 |
| 4 | Jackson Hole, WY | 99 | 95 | 92 | 92 | 91 |
| 5 | Montrose, CO | - | - | 97 | 90 | 92 |
| 6 | Steamboat Springs, CO | - | - | 75 | 68 | 93 |
| | **Non-Ski Destinations** | | | | | |
| 1 | Fresno, CA | 89 | 89 | 85 | 82 | 83 |
| 2 | Bozeman, MT | 98 | 93 | 97 | 89 | 89 |
| 3 | Redmond, OR | 96 | 96 | 93 | 94 | 90 |
| 4 | Redding, CA | 97 | 97 | 90 | 93 | 92 |
| 5 | Santa Barbara, CA | 96 | 94 | 90 | 93 | 92 |
| 6 | Medford, OR | 95 | 87 | 94 | 94 | 93 |
| 7 | Monterey, CA | 93 | 94 | 89 | 91 | 93 |
| 8 | Arcata, CA | 95 | 92 | 92 | 95 | 95 |
| | **UA-SFO Hub Average** | **97** | **96** | **96** | **96** | **96** |

*SOURCE: Diio Mi; NOTE: T100 Departures Divided By Scheduled Departures; Includes markets with CRJ-700 operations*

> *"MMH's winter 2016/2017 completion rate for Los Angeles was 75 percent - the lowest in the last five years with completion rates above 90 percent in three of the five years."*

# 5 Air Service Opportunities

This section evaluates Eastern Sierra market opportunities for incumbent air carriers and potential air carriers. A review of each commercial air carrier's existing hub activity and operating aircraft is provided as well as recommendations on top opportunities taking into account airline strategy, current operations at ski destinations and available aircraft among other factors.

## Service at Ski Destinations

The first step in assessing Eastern Sierra air service opportunities is reviewing existing air service at other ski destinations. These hubs/focus cities and aircraft are the most likely nonstop markets and equipment an airline would consider for Eastern Sierra service. The following airports were identified in *Section 4* for comparison:

- Aspen-Pitkin County Airport (ASE)
- Eagle County Regional Airport (EGE)
- Friedman Memorial Airport (SUN)
- Gunnison-Crested Butte Regional Airport (GUC)
- Jackson Hole Airport (JAC)
- Montrose Regional Airport (MTJ)
- Yampa Valley Regional Airport (HDN)

### Hubs/Focus Cities

Seven airlines provide scheduled commercial air service to the ski destinations listed above, including: Air Canada, Alaska Airlines, Allegiant Air, American Airlines, Delta Air Lines, United Airlines and Via Air. **Table 5.1** lists the destinations scheduled to be served for the year ended March 31, 2018, at the ski destination airports with the majority of service provided on a seasonal basis.

For these ski destinations, United Airlines provides the greatest amount of service with more than half of the flights and nearly half of the available seats. United is followed by American Airlines, Delta Air Lines and Alaska Airlines. Via Air, Frontier Airlines, Allegiant Air and Air Canada provide limited service to ski destinations. No other carrier than these listed provide scheduled passenger service to the identified ski markets. Eastern Sierra's most likely air service addition is by an airline that currently serves ski destinations to existing nonstop markets.

**TABLE 5.1 Service to Ski Destinations**

| Hub/Focus City | Ski Destination Airport(s) | Airline(s) | Distance to MMH |
|---|---|---|---|
| **Atlanta, GA** | ASE, EGE, HDN, JAC, MTJ | Delta | 1,946 |
| **Austin, TX** | HDN | Via Air | 1,317 |
| **Charlotte, NC** | MTJ | American | 2,105 |
| **Chicago, IL (ORD)** | ASE, EGE, GUC, HDN, JAC, MTJ, SUN | American, United | 1,664 |
| **Dallas, TX (DFW)** | ASE, EGE, GUC, HDN, JAC, MTJ | American | 1,272 |
| **Denver, CO** | ASE, EGE, GUC, HDN, JAC, MTJ, SUN | United | 781 |
| **Houston, TX (IAH)** | ASE, EGE, GUC, HDN, JAC, MTJ | United | 1,447 |
| **Kansas City, MO** | HDN | Via Air | 1,309 |
| **Los Angeles, CA** | ASE, EGE, HDN, JAC, MMH, MTJ, SUN | Alaska, Allegiant, American, Delta, United | 256 |
| **Miami, FL** | EGE | American | 2,394 |
| **Minneapolis, MN** | ASE, HDN, JAC | Delta | 1,418 |
| **New York, NY (JFK)** | EGE, JAC | American, Delta | 2,404 |
| **New York, NY (LGA)** | MTJ | United | 2,397 |
| **Newark, NJ** | EGE, HDN, JAC, MTJ | United | 2,383 |
| **Phoenix, AZ (PHX)** | ASE, EGE, JAC, MTJ | American | 482 |
| **Portland, OR** | SUN | Alaska | 582 |
| **Salt Lake City, UT** | ASE, EGE, JAC, MTJ, SUN | Delta | 429 |
| **San Diego, CA** | HDN, MMH | Alaska | 350 |
| **San Francisco, CA** | ASE, EGE, HDN, JAC, MMH, MTJ, SUN | United | 193 |
| **Seattle-Tacoma, WA** | HDN, JAC, SUN | Alaska, Delta | 700 |
| **Toronto, Canada** | EGE | Air Canada | 2,083 |
| **Washington, DC (IAD)** | EGE, HDN | United | 2,233 |

*SOURCE: Diio Mi; YE March 31, 2018*

### Aircraft

Each individual airline conducts their own operational analysis by aircraft type. What one airline determines can be operated at MMH may not be the same as another. As such, it is reasonable to use proxy markets as preliminary determinations of equipment that could be used at MMH. The most likely aircraft types that could operate at MMH are those that currently operate at ASE and SUN due to similar airport and geographic characteristics. Two primary aircraft are used: CRJ-700 and the Bombardier Q400. Operational capabilities of these aircraft vary depending on the season. Other potential MMH aircraft in the short-term are the Embraer 145XR or Embraer 175. As the market demand grows, mainline aircraft that are typically found in similar high-elevation airports include the Airbus A319 or Boeing 737-700.

**Table 5.2** shows the passengers daily each way (PDEW) for those same originating markets to each ski destination for the peak winter season (first quarter 2017). Of the ski destinations, MMH had the lowest total number of passengers to these airports and had very little traffic to connecting markets. **The ability for Mammoth Lakes to draw passengers from other areas of the country will be critical to add service to most if not all hub markets outside of California.** There is not enough demand from any single city outside of California to support service without connecting traffic. The table also shows the propensity of a given city to travel to ski destinations during the peak winter season. The top originating airports for ski destinations are: Los Angeles, Dallas-Fort Worth, Chicago-O'Hare, Newark and Houston-Intercontinental.

**TABLE 5.2 Passengers Daily Each Way (PDEW) at Ski Destination Airports**

| Hub/ Focus Market | Ski Destination Airport | | | | | | | | Total PDEW |
|---|---|---|---|---|---|---|---|---|---|
| | ASE | EGE | GUC | HDN | JAC | MMH | MTJ | SUN | |
| Los Angeles, CA | 140.6 | 51.4 | 7.5 | 18.6 | 48.0 | 50.1 | 36.1 | 48.3 | 400.5 |
| Dallas, TX (DFW) | 36.8 | 84.3 | 40.3 | 48.5 | 34.5 | 0.5 | 46.0 | 3.3 | 294.1 |
| Chicago, IL (ORD) | 79.2 | 60.6 | 7.3 | 49.5 | 44.3 | 1.0 | 33.6 | 4.1 | 279.5 |
| Newark, NJ | 45.2 | 88.6 | 3.9 | 33.1 | 66.7 | 2.1 | 30.1 | 8.2 | 278.0 |
| Houston, TX (IAH) | 47.6 | 47.8 | 16.9 | 51.7 | 19.6 | 0.6 | 38.3 | 1.6 | 224.1 |
| New York, NY (LGA) | 81.1 | 22.5 | 6.1 | 16.9 | 33.7 | 0.1 | 29.7 | 3.9 | 194.0 |
| San Francisco, CA | 61.5 | 10.5 | 2.4 | 11.5 | 39.7 | 13.5 | 15.6 | 20.1 | 174.8 |
| Miami, FL | 28.1 | 117.8 | 1.6 | 6.7 | 7.9 | 0.4 | 8.3 | 1.1 | 171.8 |
| Atlanta, GA | 21.0 | 48.5 | 5.6 | 42.2 | 28.1 | 0.3 | 17.7 | 3.7 | 167.1 |
| New York, NY (JFK) | 6.7 | 91.0 | - | 1.6 | 22.9 | 1.3 | 0.6 | 8.3 | 132.4 |
| Seattle, WA | 9.8 | 1.6 | 1.5 | 15.5 | 18.2 | 3.0 | 4.6 | 57.0 | 111.2 |
| San Diego, CA | 10.3 | 3.4 | 0.3 | 10.9 | 13.0 | 20.4 | 4.5 | 6.5 | 69.3 |
| Denver, CO | 14.8 | 2.3 | 0.1 | 1.0 | 25.7 | 0.9 | 17.8 | 5.6 | 68.1 |
| Washington, DC (IAD) | 13.8 | 13.3 | 2.4 | 19.5 | 9.8 | 0.3 | 6.8 | 1.7 | 67.5 |
| Austin, TX | 13.8 | 8.9 | 7.9 | 14.0 | 9.3 | 0.3 | 12.1 | 1.0 | 67.4 |
| Minneapolis, MN | 10.6 | 5.3 | 1.7 | 22.1 | 17.6 | 0.3 | 5.7 | 2.5 | 65.8 |
| Phoenix, AZ (PHX) | 5.9 | 9.5 | 0.5 | 2.2 | 10.3 | 0.5 | 19.0 | 5.0 | 52.9 |
| Charlotte, NC | 9.6 | 8.8 | 2.2 | 11.4 | 11.7 | - | 5.5 | 1.1 | 50.3 |
| Portland, OR | 3.7 | 0.7 | 0.8 | 4.8 | 6.2 | 1.6 | 3.2 | 12.1 | 33.0 |
| Toronto, Canada | 6.8 | 3.4 | 0.3 | 1.9 | 8.6 | - | 2.5 | 0.7 | 24.1 |
| Kansas City, MO | 4.4 | 2.0 | 1.1 | 2.8 | 3.7 | - | 2.4 | 0.4 | 16.8 |
| Salt Lake City, UT | 3.4 | 0.6 | 0.1 | 0.5 | 6.7 | 0.1 | 0.4 | 2.2 | 14.0 |
| **Total Originating Markets** | **654.7** | **682.8** | **110.5** | **386.7** | **486.1** | **97.3** | **340.4** | **198.3** | **2,956.7** |

*SOURCE: Diio Mi; 1Q 2017*

## Incumbent Airlines

Currently, Alaska Airlines and United Airlines provide service at MMH. Each of the airlines are discussed in this section with a review of their existing departures and seats by hub/focus city, equipment type used and potential additional opportunities in the Eastern Sierra market. Incumbent airlines are the most likely to add destinations due to lower risk compared to other airlines that must add a new station and absorb those costs.

### Alaska Airlines

Alaska is one of the strongest airlines on the West Coast. Looking forward, it is anticipated that Alaska will continue to add flights to Seattle and respond to Delta Air Lines' growth and competition in Seattle. The merger with Virgin America was officially closed in December 2016. This purchase greatly increased the footprint of Alaska on the West Coast, especially in the San Francisco Bay Area, in which Virgin has its primary hub of operations. Because of the merger, Alaska is also now focused on the San Francisco Bay Area and Los Angeles Basin for growth as well as other California destination markets.

#### Hubs/Focus Cities

**Table 5.3** compares Alaska/Virgin America's average daily departures and seats in January 2018 to January 2017. The majority of Alaska/Virgin America's flying is based in Seattle, Portland, San Francisco and Los Angeles, but they have made overtures to focus cities in California such as San Diego and San Jose. Alaska/Virgin America plans to increase seats at each of its hubs/focus cities year-over-year. The highest growth on a percentage basis is San Francisco, San Diego and San Jose, each with double digit growth. All of Alaska's hubs/focus cities listed are within a 700-mile stage length to MMH except for Anchorage.

#### Aircraft in Use

**Table 5.4** provides aircraft in use for January 2018. Sixty-one percent of departures will be provided on mainline aircraft while 23 percent will be provided with Bombardier Q400 aircraft, down from 31 percent. The remaining departures are contracted through SkyWest Airlines with the Embraer 175. CRJ-700 aircraft are continuing to be phased out. The use of CRJ-200 aircraft is temporary as SkyWest assists Horizon with their pilot shortage issues.

Alaska has placed a large order for more Boeing aircraft, specifically 50 Boeing 737-900ERs and the Boeing 737MAX. Alaska also placed an order for 30 additional Embraer 175 aircraft that will be operated by Horizon. It is expected that the first 15 deliveries through 2018 will be used to replace 15 Bombardier Q400 aircraft. This exchange will likely increase the amount of flying on the same number of aircraft, as the Embraer 175 is faster and able to fly more hours in a given day than a Bombardier Q400.

**TABLE 5.3 Alaska Airlines/Virgin America – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Seattle-Tacoma, WA** | 700 | 36,920 | 287 | 129 | 3 | 2 | 1 |
| **Portland, OR** | 582 | 13,531 | 121 | 112 | 3 | (0) | 4 |
| **San Francisco, CA** | 193 | 13,179 | 91 | 145 | 18 | 25 | (5) |
| **Los Angeles, CA** | 256 | 12,439 | 84 | 148 | 6 | 6 | (0) |
| **San Diego, CA** | 350 | 5,574 | 44 | 126 | 27 | 38 | (8) |
| **Anchorage, AK** | 2,109 | 5,531 | 39 | 143 | 1 | (11) | 13 |
| **San Jose, CA** | 170 | 4,043 | 35 | 116 | 26 | 35 | (6) |
| **Total all markets** | | **155,051** | **1,220** | **127** | **7** | **6** | **1** |

**TABLE 5.4 Alaska Airlines/Virgin America – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Boeing 737** | 124-181 | 544 | 520 | 5 |
| **Bombardier Q400** | 76 | 279 | 356 | (22) |
| **Airbus A320** | 146-149 | 161 | 159 | 1 |
| **Embraer 175** | 76 | 159 | 77 | 106 |
| **Canadair CRJ-200** | 50 | 37 | 0 | 100 |
| **Airbus A319** | 119 | 28 | 31 | (9) |
| **Airbus A321** | 185 | 13 | 0 | 100 |
| **Canadair CRJ-700** | 70 | 0 | 5 | (100) |
| **Total all aircraft** | | **1,220** | **1,148** | **6** |

*SOURCE: Diio Mi; as of 11/1/2017*

### Eastern Sierra Market Opportunities

Alaska operates the Bombardier Q400 and Embraer 175 to ski destinations but only the Bombardier Q400 to SUN (no service provided at ASE). The following is a review of the potential Eastern Sierra opportunities at the most relevant Alaska hubs/focus cities not currently served at MMH:

- **Portland, OR**: Only one ski destination is currently served to/from Portland, SUN by Alaska on a less-than-daily basis. At a stage length of 582 miles, while a Bombardier Q400 could likely operate to MMH from Portland during the winter and summer seasons, the market has minimal ski destinations and traffic today.
- **San Francisco, CA**: The San Francisco Bay Area is currently served by United Airlines on a seasonal basis from MMH. Given this, duplicative service by Alaska is not considered a top priority for the Eastern Sierra region during the winter season.
- **San Jose, CA**: With existing San Francisco Bay Area service by United, San Jose is also not considered a top priority/opportunity. In addition, no ski destinations are currently served nonstop to San Jose and connecting destinations would be limited. Alaska provided winter seasonal San Jose service from 2009 through 2012 at MMH. Load factors averaged 45 percent which is likely a deterrent for them to add service again between the market pair. Since that time, however, Alaska has refocused on the San Jose hub with better, but still limited, connecting opportunities beyond.
- **Seattle, WA**: Two ski destinations have nonstop service to Seattle by Alaska, HDN and SUN. At a stage length of 700 miles, Alaska is likely unwilling to operate the service with a Bombardier Q400 as the longest stage length they currently serve with that aircraft is 664 miles. Alaska is actively replacing longer stage length flights operated with the Bombardier Q400 with the Embraer 175; however, there is a question as to the operational capabilities of the Embraer 175 at MMH. Alaska would need to do a detailed operational assessment prior to considering service with this aircraft. The only other aircraft available for Seattle service is mainline aircraft in the short term. No ski market is served with Alaska's mainline aircraft. As such, this is considered a long-term opportunity for the Eastern Sierra region.

With current service to San Francisco on United, the ability for service on Alaska to be supported to the San Francisco Bay Area (i.e., San Francisco or San Jose) would be questionable, given the already relatively weak local passenger traffic on United. While Portland service could likely be operationally supported with Bombardier Q400 service with today's runway length, the market has minimal service to ski destinations today and would be a long-term effort to improve passengers. Seattle garners more ski traffic; however, the likely inability today to operate at MMH with regional aircraft that Alaska operates on the stage length also makes it a long-term opportunity.

## United Airlines

With United's financial performance, on-time performance and other metrics lagging the industry, United looked towards changes in management. United has experienced significant upper management turnover recently with Oscar Munoz onboard as Chief Executive Officer, Scott Kirby from American Airlines as the new President and Andrew Levy from Allegiant Air as Chief Financial Officer. With the change in management, United is looking for growth and has focused on smaller "heartland" markets to increase their presence across the US.

### Hubs/Focus Cities

United operates hubs at Houston-Intercontinental, Chicago-O'Hare, Newark, Denver, San Francisco, Washington-Dulles and, to a lesser extent, Los Angeles. **Table 5.5** shows seat and departure growth at each of United's hubs year-over-year. The most significant increases on a percentage basis for seats will occur at the San Francisco hub, whereas Chicago-O'Hare is scheduled to experience double digit departure growth. Overall, United's seats and departures will increase 6 percent year-over-year.

### Aircraft in Use

**Table 5.6** provides the average daily departures by aircraft for January 2018. United continues to alter its regional fleet significantly. The Bombardier Q400 were completely retired in 2016, eliminating over 100 daily departures at one point in time. Use of the 50-seat regional jet aircraft account for more than 1,300 daily departures for the United network, or 31 percent of departures. The retirements for the 50-seat aircraft are expected to accelerate over the next couple of years, as the contracts with partners such as ExpressJet were adjusted to park the small regional jets in favor of larger regional jets and mainline aircraft, but the timing is in question.

**TABLE 5.5 United Airlines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Houston, TX (IAH)** | 1,447 | 52,369 | 478 | 110 | 3 | 2 | 1 |
| **Chicago, IL (ORD)** | 1,664 | 51,444 | 511 | 101 | 7 | 10 | (3) |
| **Newark, NJ** | 2,383 | 45,329 | 374 | 121 | 5 | 1 | 3 |
| **Denver, CO** | 781 | 38,273 | 368 | 104 | 5 | 8 | (3) |
| **San Francisco, CA** | 193 | 36,781 | 262 | 140 | 10 | 7 | 4 |
| **Washington, DC (IAD)** | 2,233 | 20,360 | 194 | 105 | 1 | 4 | (2) |
| **Los Angeles, CA** | 256 | 17,811 | 129 | 138 | 4 | 2 | 2 |
| **Total all markets** | | **476,393** | **4,380** | **109** | **6** | **6** | **0** |

**TABLE 5.6 United Airlines – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Boeing 737** | 118-179 | 1,014 | 976 | 4 |
| **Embraer 170/175** | 69-76 | 787 | 676 | 16 |
| **Embraer 145** | 50 | 732 | 833 | (12) |
| **Canadair CRJ-200** | 50 | 628 | 341 | 84 |
| **Canadair CRJ-700** | 70 | 306 | 367 | (17) |
| **Airbus A320** | 150 | 296 | 297 | (0) |
| **Airbus A319** | 128 | 243 | 205 | 18 |
| **Boeing 757** | 142-213 | 137 | 133 | 3 |
| **Boeing 777** | 267-366 | 118 | 101 | 17 |
| **Boeing 767** | 183-242 | 62 | 64 | (4) |
| **Boeing 787** | 219-252 | 42 | 35 | 21 |
| **ATR-42/72** | 46 | 11 | 11 | 0 |
| **Bombardier Q200/300** | 37-50 | 4 | 90 | (95) |
| **Boeing 747** | 374 | 0 | 12 | (100) |
| **Total all aircraft** | | **4,380** | **4,141** | **6** |

*SOURCE: Diio Mi; as of 11/1/2017*

Similar to other legacy carriers, United has placed orders for new mainline aircraft to replace both older mainline aircraft as well as some regional jet aircraft. With the change in management, United has adjusted several orders for different aircraft that it today feels would better fit its business model. This includes adjustments to both narrow and wide-body jet aircraft produced by Boeing and Airbus.

### Eastern Sierra Market Opportunities

United operates Airbus, Boeing, CRJ-200, CRJ-700, Embraer 175 and Embraer 145 aircraft at other ski destinations; however, only the CRJ-700 and Embraer 175 are operated at ASE and SUN. The following is a review of the potential Eastern Sierra opportunities at each of United's hubs:

- **Chicago-O'Hare, IL**: Six ski destinations (i.e., ASE, EGE, HDN, JAC, MTJ and SUN) have United service to Chicago-O'Hare. Chicago is one of the top markets for ski destinations and is an opportunity for the Eastern Sierra region; however, the long 1,664-mile stage length limits the type of aircraft that could operate the service. It is likely that only mainline aircraft could operate the service in the winter or summer seasons. While United operates some ski destinations with mainline aircraft to/from Chicago, it is very limited. This is considered a short-term opportunity for the Eastern Sierra region; however, significant market demand would be required to support mainline service.
- **Denver, CO**: Denver is also a top ski destination market with service by United to seven ski destinations (i.e., ASE, EGE, GUC, HDN, JAC, MTJ and SUN). The 781-mile stage length from MMH to Denver is a reasonably short stage length and is a top Eastern Sierra opportunity. However, United operated very limited Saturday only service in February and March of 2015 and 2016. Load factors were extremely low, averaging 26 percent for those four months. This may be a deterrent for United.
- **Houston-Intercontinental, TX**: Six ski markets, including ASE, EGE, GUC, HDN, JAC and MTJ, currently have service to Houston by United and is considered an opportunity for the Eastern Sierra region. The 1,447-mile stage length would likely require mainline aircraft. Currently United operates mainline aircraft in several ski markets; however, like Chicago, significant market demand to/from Mammoth Lakes is needed to support the service.
- **Los Angeles, CA**: The Los Angeles Basin is currently served by Alaska on a year round basis from MMH. Given this, duplicative service by United to the Los Angeles Basin is not considered a top priority for the Eastern Sierra region.
- **Newark, NJ**: While four ski markets (i.e., EGE, HDN, JAC and MTJ) have service to Newark, all on mainline aircraft, this is not likely a top opportunity for the Eastern Sierra region given the long stage length of 2,383 miles. At that stage length, mainline aircraft would be required.
- **Washington-Dulles, DC**: Only EGE and HDN are served to Washington Dulles with both services provided by United on mainline aircraft. Like Newark, the long stage length (2,233 miles) and limited service make this an unlikely opportunity as it would require the use of mainline aircraft and significant market demand.

Based on the above, the top short-term opportunities for expanded United Airlines service are Chicago-O'Hare and Denver. Other opportunities like Houston, Los Angeles, Newark and Washington-Dulles are considered long-term opportunities once the market grows and proves demand like other ski destinations such as EGE and HDN.

*"Short-term opportunities for the Eastern Sierra region for United include Chicago-O'Hare and Denver. Houston, Los Angeles, Newark and Washington-Dulles are long-term opportunities."*

## Potential Airlines

This section includes a discussion of airlines that do not currently serve the Eastern Sierra region, including: Allegiant Air, American Airlines, Delta Air Lines, Frontier Airlines, JetBlue Airways, Southwest Airlines and Spirit Airlines. A discussion on other potential airlines is included at the end of the section.

### Allegiant Air

Allegiant has been changing their strategy with the majority of its growth since 2014 in larger markets such as Austin, Cincinnati, Cleveland, Indianapolis, Newark, New Orleans and Pittsburgh. Allegiant continues to discuss opportunities to Mexico and the Caribbean.

#### Hub/Focus Cities

Allegiant's leisure destination oriented service is focused primarily on service to Orlando-Sanford, Tampa-St. Petersburg, Las Vegas, Punta Gorda and Phoenix-Mesa with limited service in select other markets. Service is typically provided through secondary airports (e.g., Sanford, Mesa) and is generally on a less-than-daily basis (two to three times weekly). **Table 5.7** compares Allegiant's average weekly departures and seats in January 2018. Allegiant's primary growth is in Florida markets. Overall seats and departures will increase 6 percent.

#### Aircraft in Use

**Table 5.8** provides Allegiant's aircraft in use for January 2018. Allegiant has been aggressively transforming its fleet from a MD-80 operation to an Airbus fleet. The MD-80 fleet is down to approximately one-quarter of all daily departures (27 percent) and will continue to shrink as MD-80s are replaced by the Airbus A319/320-series throughout 2018. This fleet change has had a profound impact on the schedule model for the airline. The MD-80 aircraft were inexpensive to purchase but expensive to operate due to their relative older age (high fuel and maintenance costs). The transition to a younger Airbus fleet increases the ownership costs, while reducing the relative cost for fuel and maintenance. This change will likely necessitate the airline to operate the aircraft more each week on average, and limit its ability to park the airplanes on historically slower days such as Tuesday, Wednesday or Saturday. With the need to operate aircraft more days each week, Allegiant has shifted much of its focus to larger markets that can support greater frequency.

**TABLE 5.7 Allegiant Air – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Orlando, FL (SFB)** | 2,246 | 27,962 | 164 | 170 | 1 | 1 | 0 |
| **Las Vegas, NV** | 231 | 26,207 | 160 | 163 | (3) | 1 | (4) |
| **St. Petersburg, FL** | 2,194 | 22,284 | 127 | 175 | 10 | 7 | 3 |
| **Punta Gorda, FL** | 2,264 | 16,296 | 93 | 175 | 29 | 27 | 1 |
| **Phoenix, AZ (AZA)** | 503 | 15,394 | 99 | 156 | 12 | 13 | (1) |
| **Cincinnati, OH** | 1,849 | 9,471 | 60 | 158 | 17 | 18 | (1) |
| **Fort Lauderdale, FL** | 2,391 | 9,245 | 53 | 174 | 10 | 9 | 1 |
| **Total all markets** | | **260,465** | **1,554** | **168** | **6** | **6** | **0** |

**TABLE 5.8 Allegiant Air – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Airbus A320** | 177 | 658 | 421 | 56 |
| **Airbus A319** | 156 | 474 | 395 | 20 |
| **McDonnell Douglas MD-80** | 166 | 422 | 621 | (32) |
| **Boeing 757** | 223 | 0 | 29 | (100) |
| **Total all aircraft** | | **1,554** | **1,467** | **6** |

*SOURCE: Diio Mi; as of 11/1/2017*

#### Eastern Sierra Market Opportunities

Allegiant provides air service to only one ski destination, MTJ to Los Angeles, which operates seasonally and less-than-daily. With MMH's existing Los Angeles service and Allegiant's focus on medium/large cities, Allegiant is not considered a short-term opportunity for the Eastern Sierra region. However, if Allegiant refocuses on smaller markets, Allegiant could be a long-term opportunity for Los Angeles, Las Vegas or Phoenix-Mesa. The previous Alaska service to Las Vegas during the winter 2015 season may be a deterrent given the low load factors, averaging 14 to 31 percent by month. Service to Florida markets do not fit with Allegiant's operating model due to the stage length. No market pair is served over 1,900 miles in January 2018.

## American Airlines

Post-merger with US Airways, American Airlines is the largest airline in the world with numerous hubs across the US. American has been investing in fortifying their existing hubs, and with a large influx of new aircraft, American is on the path to have the youngest fleet of the legacy airlines.

### Hub/Focus Cities

**Table 5.9** compares American's departures and seats in January 2018 with the prior year. Overall, average daily seats will increase 1 percent while departures will decrease less than 1 percent. The most significant hub changes on a percentage basis year-over-year will be at Chicago-O'Hare and Philadelphia. The only hub with scheduled decreases in seats and departures is Charlotte.

### Aircraft in Use

**Table 5.10** outlines the aircraft in use for American in January 2018. Forty-seven percent of departures will be provided on Airbus, Boeing or MD-80 mainline aircraft; 18 percent of departures will be with 50-seat or smaller regional jet aircraft, down from 21 percent in January 2017. Only 1 percent will be provided with turboprop aircraft.

American has embarked on a massive fleet renewal process, and by the end of 2017, its fleet will be the youngest of any of the major airlines in the US. They are replacing MD-80 and Boeing 757 aircraft with Airbus A319 and A321 aircraft, while replacing much of the Boeing 767 and Airbus A330 fleets with new wide-body aircraft such as Boeing 787s. This has created significant flux in the departures and capacities on many routes as they are rightsizing their schedules for each market. These changes are predominately resulting in larger gauge (more seats) than the older aircraft. On the regional side, American Eagle is also going through a massive re-fleeting

**TABLE 5.9 American Airlines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Dallas, TX (DFW)** | 1,272 | 88,760 | 703 | 126 | 1 | (1) | 2 |
| **Charlotte-Douglas, NC** | 2,105 | 65,538 | 599 | 109 | (0) | (2) | 1 |
| **Miami, FL** | 2,394 | 48,215 | 336 | 143 | (1) | 2 | (3) |
| **Chicago, IL (ORD)** | 1,664 | 44,154 | 427 | 103 | 6 | 3 | 2 |
| **Phoenix, AZ (PHX)** | 482 | 33,197 | 255 | 130 | 1 | 1 | 0 |
| **Philadelphia, PA** | 2,337 | 32,983 | 323 | 102 | 6 | (2) | 8 |
| **Los Angeles, CA** | 256 | 25,294 | 184 | 138 | 0 | (2) | 2 |
| **Washington, DC (DCA)** | 2,256 | 19,354 | 225 | 86 | 0 | 1 | (1) |
| **Total all markets** | | **667,070** | **5,960** | **112** | **1** | **(0)** | **2** |

**TABLE 5.10 American Airlines – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Boeing 737** | 160 | 1,027 | 944 | 9 |
| **Embraer 170/175** | 76 | 742 | 642 | 16 |
| **Embraer 140/145** | 44-50 | 712 | 642 | 11 |
| **Airbus A321** | 102-187 | 710 | 661 | 7 |
| **Canadair CRJ-900** | 76 | 619 | 634 | (2) |
| **Canadair CRJ-700** | 63-70 | 575 | 416 | 4 |
| **Airbus A319** | 128 | 454 | 488 | (7) |
| **Canadair CRJ-200** | 50 | 355 | 611 | (42) |
| **Airbus A320** | 150 | 176 | 181 | (3) |
| **McDonnell Douglas MD-80** | 140 | 175 | 220 | (20) |
| **Embraer 190** | 99 | 94 | 91 | 3 |
| **Boeing 777** | 260-310 | 78 | 80 | (2) |
| **Bombardier Q200/300** | 35-48 | 74 | 170 | (56) |
| **Boeing 757** | 176-188 | 66 | 99 | (33) |
| **Boeing 787** | 226-285 | 37 | 24 | 51 |
| **Airbus A330** | 258-291 | 34 | 33 | 3 |
| **Boeing 767** | 209 | 30 | 50 | (40) |
| **Total all aircraft** | | **5,960** | **5,986** | **(0)** |

*SOURCE: Diio Mi; as of 11/1/2017*


post-merger. American is increasing the number of large regional jets, allowing for hundreds of 76-seat aircraft. American was previously limited to just 47 65-seat regional jets. With this change, most of their smaller regional jets (37-seat and 44-seat) are being replaced with the larger 76-seat regional jets. It is expected that long term the majority of the 50-seat aircraft at American will also be retired.

### Eastern Sierra Market Opportunities

American operates Airbus, Boeing, CRJ-700, CRJ-900, Embraer 175, Embraer 145 and McDonnell Douglas aircraft at ski destinations; however, only CRJ-700 aircraft is used at ASE (American does not serve SUN). The following is a review of the potential Eastern Sierra opportunity at each of American's hubs:

- **Charlotte-Douglas, NC**: American provides MTJ once weekly service during the winter season on Airbus A319 aircraft. With such limited Charlotte service provided by American to ski destinations and the 2,105-mile stage length, this is likely not an opportunity for the Eastern Sierra region.
- **Chicago-O'Hare, IL**: Five ski destinations (i.e., ASE, EGE, HDN, JAC and MTJ) have service to Chicago-O'Hare by American using the Airbus A319 and the CRJ-700. At the 1,664-mile stage length it is likely that only the Airbus A319 could operate the service in the winter or summer seasons at MMH. This is considered a short-term opportunity for the Eastern Sierra region; however, significant market demand will be required.
- **Dallas-Fort Worth, TX**: ASE, EGE, GUC, HDN, JAC and MTJ have service provided by American to Dallas-Fort Worth. Multiple aircraft types are used. At the 1,272-mile stage length, it is likely that only the Airbus A319 could operate at MMH. A runway extension to 9,000 feet could potentially increase the number of aircraft types that could operate the service; however, American would need to perform a detailed operational analysis for regional aircraft.
- **Los Angeles, CA**: With current Los Angeles service, duplicative service by American is not considered a top priority for the Eastern Sierra region.
- **Miami, FL**: The only ski destination with Miami service is EGE, seasonally with the Boeing 757. With the long 2,394-mile stage length and limited ski destination service provided, this is not an opportunity.
- **Philadelphia, PA**: No current ski destination has service to Philadelphia. Mammoth Lakes is unlikely to be the first ski destination with a 2,337-mile stage length.
- **Phoenix-Sky Harbor, AZ**: ASE, EGE, JAC and MTJ have Phoenix-Sky Harbor service, operated with the Airbus A319, CRJ-700 or CRJ-900. At a short 482-mile stage length, it is likely that each of these aircraft could operate MMH-Phoenix service in the winter; however, only the Airbus could likely operate during the summer until the runway is extended. American would need to perform an in-depth operational analysis to determine any potential restrictions during the winter or summer season. This is considered a short-term opportunity for the Eastern Sierra region.
- **Washington-National, DC**: Due to the slot perimeter rules in place for Washington National, this is not an opportunity as Eastern Sierra is well outside of the maximum range allowed for nonstop service.

In summary, short term opportunities include Chicago-O'Hare, Dallas-Fort Worth and Phoenix-Sky Harbor.

## Delta Air Lines

Delta has focused on lowering unit costs and improving customer experience since their merger with Northwest Airlines. Delta has consistently ranked as one of the top airlines for operational performance and customer service since the merger and continues to evolve as an airline focusing on operational and product excellence. They have also been active in route network adjustments, with Memphis no longer being a hub and Cincinnati now considered a focus city like Raleigh-Durham.

### Hub/Focus Cities

Across the Delta system, Delta operates an extensive route network with hubs/focus cities at Atlanta, Detroit, Minneapolis, Salt Lake City, New York Kennedy and LaGuardia, Los Angeles and Seattle. **Table 5.11** provides frequency and capacity changes at Delta's hubs. All hubs except Atlanta are scheduled to increase in seats compared to January 2017. Atlanta continues to be the largest hub in the world for a single airline, with more than 850 daily departures. The most significant year-over-year growth on a percentage basis will occur at Seattle, with a 16 percent increase in seats and 12 percent increase in departures.

### Aircraft in Use

Delta's fleet distribution by hub is depicted in **Table 5.12**. Delta has continued to reduce the total number of 50-seat regional jets in its network while adding larger regional jets and mainline flying. The CRJ-200 is the only regional aircraft type that will experience year-over-year decreases in January while the CRJ-900 is scheduled to increase 7 percent and has the second largest number of departures in Delta's fleet. The Embraer 170/175 and CRJ-700 will also increase year-over-year with departure increases of 6 and 8 percent, respectively.

**TABLE 5.11 Delta Air Lines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Atlanta, GA** | 1,946 | 119,918 | 854 | 140 | (1) | (2) | 2 |
| **Detroit, MI** | 1,898 | 38,146 | 365 | 105 | 1 | 0 | 0 |
| **Minneapolis, MN** | 1,418 | 37,956 | 331 | 115 | 1 | (1) | 2 |
| **Salt Lake City, UT** | 429 | 24,540 | 223 | 110 | 3 | 2 | 1 |
| **New York, NY (JFK)** | 2,404 | 24,512 | 184 | 133 | 2 | (2) | 4 |
| **Los Angeles, CA** | 256 | 20,278 | 146 | 139 | 3 | (2) | 6 |
| **New York, NY (LGA)** | 2,397 | 19,494 | 209 | 93 | 1 | (1) | 2 |
| **Seattle-Tacoma, WA** | 700 | 14,919 | 124 | 121 | 16 | 12 | 3 |
| **Total all markets** | | **573,360** | **4,808** | **119** | **2** | **0** | **2** |

**TABLE 5.12 Delta Air Lines – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **McDonnell Douglas MD-88/90** | 149-158 | 702 | 775 | (9) |
| **Canadair CRJ-900** | 76 | 691 | 645 | 7 |
| **Canadair CRJ-200** | 50 | 688 | 803 | (14) |
| **Boeing 737** | 124-180 | 557 | 467 | 19 |
| **Boeing 717** | 110 | 420 | 430 | (2) |
| **Canadair CRJ-700** | 69 | 384 | 355 | 8 |
| **Embraer 170/175** | 69-76 | 372 | 352 | 6 |
| **Boeing 757** | 168-234 | 279 | 304 | (8) |
| **Airbus A320** | 150-160 | 201 | 225 | (11) |
| **Airbus A319** | 132 | 194 | 184 | 5 |
| **Airbus A321** | 192 | 127 | 73 | 75 |
| **Boeing 767** | 208-261 | 110 | 116 | (5) |
| **Airbus A330** | 234-293 | 59 | 53 | 12 |
| **Boeing 777** | 291 | 19 | 18 | 5 |
| **Airbus A350** | 306 | 4 | 0 | 100 |
| **Boeing 747** | 376 | 0 | 6 | (100) |
| **Total all aircraft** | | **4,808** | **4,807** | **0** |

*SOURCE: Diio Mi; as of 11/1/2017*

Delta continues to evolve its fleet and placed an order with Bombardier for 75 of their C-Series 300 aircraft, which will fit in size between the Boeing 717 and 737 aircraft. Delta has stated that the purpose of those aircraft will be to replace more 50-seat regional jets, leaving just a fraction of what Delta operated at one point. Delta is also expanding their fleet with the CRJ-900 and Embraer 175 larger regional jets and will continue to receive new Boeing 737-900ER aircraft through 2018.

### Eastern Sierra Market Opportunities

Delta operates Airbus, Boeing, CRJ-700 and Embraer 175 aircraft at ski destinations; however, only CRJ-700 and Embraer 175 aircraft are operated at ASE and SUN. The Bombardier CS-300 is on order and could potentially operate in the future at MMH if the aircraft can meet the operational capabilities. The following is a review of the potential Eastern Sierra opportunity at each of Delta's hubs:

- **Atlanta, GA**: Delta provides service from Atlanta to five ski destinations, including ASE, EGE, HDN, JAC and MTJ. Delta operates the services with mainline aircraft and the CRJ-700. At the 1,946-mile stage length, only the Boeing 737-700 could likely operate at MMH. Atlanta is considered a short-term opportunity for the Eastern Sierra region although strong market demand would be needed to support the mainline aircraft.
- **Detroit, MI**: No current ski destination has service to Detroit. In addition, Delta has very little planned growth at Detroit. As such, Eastern Sierra-Detroit service is unlikely, particularly at the 1,898-mile stage length.
- **Los Angeles, CA**: The Los Angeles Basin is currently served by Alaska on a year round basis from MMH. Given this, duplicative service by Delta to the Los Angeles Basin is not considered a top priority for the Eastern Sierra region.
- **Minneapolis, MN**: Three ski destinations, ASE, HDN and JAC, have nonstop Minneapolis service provided by Delta. The services are provided with mainline aircraft and CRJ-700 aircraft. At the 1,418-mile stage length, only the Airbus A319 could likely operate at MMH in the winter and/or summer at the existing runway length. Other aircraft like the CRJ-700 could potentially operate at MMH at this stage length with a runway extension.
- **New York-Kennedy/New York-LaGuardia, NY**: Of the seven comparison ski destinations listed, Delta only provides service between JAC and New York-Kennedy. No ski destination has service by Delta to New York-LaGuardia. JAC's service to New York-Kennedy is limited to just 15 annual departures. Based on this limited service to ski destinations and the approximate 2,400-mile stage length, neither New York-Kennedy nor New York-LaGuardia are considered an opportunity for Eastern Sierra service.
- **Salt Lake City, UT**: Salt Lake City is a prime hub for ski destination markets with five ski destinations having service provided by Delta, including ASE, EGE, JAC, MTJ and SUN. Fifty-eight percent of ski market service is provided with the CRJ-700 aircraft with the majority of the remaining departures provided on Airbus A319 aircraft. At the 429-mile stage length, MMH-Salt Lake City service could likely be provided by either aircraft in the winter.
- **Seattle, WA**: Two ski destinations had nonstop service to Seattle by Delta, including JAC and SUN. Service was provided by the CRJ-700 and Embraer 175 aircraft. Due to weak performance, Delta discontinued competitive service to SUN at the end of summer 2017. At the existing runway length, the 700-mile stage length could likely be provided by Delta with CRJ-700 aircraft; however, an in-depth operational analysis by Delta would need to be performed to determine any restrictions on performance during the winter or summer season.

In summary, Atlanta, Minneapolis, Salt Lake City and Seattle are short-term opportunities.

> *"For Delta in the Eastern Sierra region, short-term opportunities include Atlanta, Minneapolis, Salt Lake City and Seattle. Other Delta hubs are unlikely due to lack of or limited service at other ski destinations."*

## Frontier Airlines

Frontier was purchased by Indigo Partners, which previously owned Spirit Airlines. Indigo has transformed Frontier into an ultra-low-cost carrier, similar to Spirit Airlines. Frontier has become less Denver centric and has been focusing on opportunistic growth in larger markets. Their existing growth has been in very large markets, while canceling service to smaller markets.

### Hub/Focus Cities

Frontier is actively growing their hub/focus cities in 2018 (**Table 5.13**) focusing on markets with significant local demand. Frontier continues reductions at Denver, reducing capacity 1 percent, while Orlando-International and Las Vegas are growing significantly year-over-year. In total, Frontier's average daily seats will increase 28 percent while departures will increase 25 percent.

### Aircraft in Use

Frontier continues to adjust their Airbus fleet mix (**Table 5.14**). Frontier's smallest aircraft, the Airbus A319 (150 seats), will shrink by 12 percent in departures, while the A320 (180 seats) and A321 (230 seats) will have significant growth.

### Eastern Sierra Market Opportunities

Frontier does not currently serve any of the identified ski destinations. Historically, however, Frontier served ASE (2008 to 2012), HDN (2008 to 2012) and JAC (2008 to 2014) to Denver. Frontier exited the markets along with several other smaller markets when it began modifying its business model to become a ULCC. Although Frontier is in growth mode, there has been no indication that they are considering returning to serving smaller markets into Denver.

**TABLE 5.13 Frontier Airlines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Denver, CO** | 781 | 9,722 | 55 | 178 | (1) | (1) | 1 |
| **Orlando, FL (MCO)** | 2,252 | 7,334 | 38 | 194 | 35 | 33 | 2 |
| **Las Vegas, NV** | 231 | 4,097 | 21 | 191 | 17 | 13 | 4 |
| **Total all markets** | | **62,005** | **335** | **185** | **28** | **25** | **3** |

**TABLE 5.14 Frontier Airlines – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Airbus A320** | 180 | 174 | 122 | 43 |
| **Airbus A321** | 230 | 82 | 57 | 45 |
| **Airbus A319** | 150 | 78 | 89 | (12) |
| **Total all aircraft** | | **335** | **268** | **25** |

*SOURCE: Diio Mi; as of 11/1/2017*

## JetBlue Airways

With consistently strong profits, JetBlue has generally grown at a fairly fast rate compared to other airlines. However, recently, JetBlue has slowed their growth from historical numbers but continues growth mainly to the Caribbean and Latin America.

### Hub/Focus Cities

JetBlue Airways operates hubs at New York-Kennedy and Boston with several other focus cities such as Fort Lauderdale, Orlando-International and Long Beach. Average daily seats are scheduled to be up 3 percent in January 2018 compared to the prior year while departures are scheduled to be up 2 percent (**Table 5.15**). Capacity will increase for all markets listed except New York-Kennedy, with the largest percentage increase at Boston.

### Aircraft in Use

**Table 5.16** outlines JetBlue's aircraft fleet in use. JetBlue primarily operates the 150-seat Airbus A320 and the 100-seat Embraer 190. JetBlue historically had limited flying with the larger Airbus A321; however, Airbus A321 departures are scheduled to increase 31 percent for January 2018 while A320 departures will decrease.

### Eastern Sierra Market Opportunities

JetBlue does not serve any of the identified ski destinations and have not historically served these markets. JetBlue has been focusing its growth in its northeast (i.e., Boston and Newark), Florida (i.e., Fort Lauderdale) and West Coast (i.e., Long Beach) hubs/focus cities. Eastern Sierra service is unlikely due to JetBlue's focus on larger markets and lack of ski destination service. In addition, with the exception of Long Beach (part of the Los Angeles Basin at a stage length of 266 miles), JetBlue's focus markets all exceed 2,000 miles and have a high opportunity cost to initiate service.

## Southwest Airlines

Southwest's merger with AirTran was finalized in 2014 when the final flights of AirTran were ended and shifted over to operating as Southwest. Southwest added a new reservations system for international flights, allowing them to be added, albeit relatively limited. In October 2014, the Wright Amendment, which restricted operations by Southwest at Dallas-Love Field, expired and led to new nonstop service to markets like Los Angeles, San Diego and Phoenix. Southwest continues to grow its capacity each year; however, capacity increases are predominately due to replacing smaller, older Boeing 737-300 aircraft with larger Boeing 737-800 and Max 8 aircraft. Southwest discontinued use of the smaller Boeing 737-300 aircraft in October 2017. New rules for ground handling and scheduling will allow limited seasonal and less-than-daily service in the future.

### Hub/Focus Cities

**Table 5.17**, next page, compares Southwest's focus city average daily departures and seats in January 2018 with the prior year. All markets will experience increases in capacity over January 2017 except Phoenix-Sky Harbor. The most significant percentage increase in capacity will occur at San Diego. Overall seats will increase 4 percent while departures will increase 2 percent year-over-year.

### Aircraft in Use

**Table 5.18**, next page, outlines Southwest's aircraft fleet in use. Southwest operates a fleet of Boeing 737 aircraft. As noted previously, Southwest discontinued use of Boeing 737-300 aircraft and has been replacing them with a combination of Boeing 737-700, -800 and Max 8 aircraft.

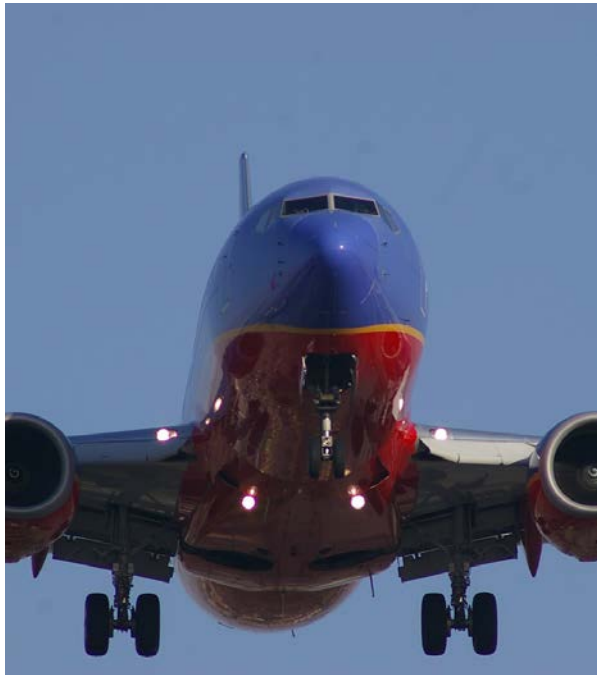
**TABLE 5.15 JetBlue Airways Airlines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **New York, NY (JFK)** | 2,404 | 21,650 | 143 | 151 | (0) | (1) | 1 |
| **Boston, MA** | 2,526 | 18,420 | 143 | 129 | 14 | 10 | 3 |
| **Fort Lauderdale, FL** | 2,391 | 14,055 | 101 | 140 | 3 | 3 | (0) |
| **Orlando, FL (MCO)** | 2,252 | 8,924 | 61 | 146 | 2 | (0) | 3 |
| **Long Beach, CA** | 266 | 5,250 | 35 | 150 | 5 | 5 | (0) |
| **Total all markets** | | **136,465** | **987** | **138** | **3** | **2** | **1** |

**TABLE 5.16 JetBlue Airways – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Airbus A320** | 150 | 531 | 546 | (3) |
| **Embraer 190** | 100 | 349 | 337 | 3 |
| **Airbus A321** | 159-200 | 162 | 124 | 31 |
| **Total all aircraft** | | **1,041** | **1,007** | **3** |

*SOURCE: Diio Mi; as of 11/1/2017*



The Boeing 737-800 fleet is significantly larger in term of seats than the other aircraft and is the bulk of the new aircraft deliveries that Southwest has scheduled going forward. This will apply pressure to markets that are potentially on the bubble to support mainline Southwest service, since the Boeing 737-800 aircraft seat 175 instead of 122 or 143 seats of the older aircraft.

### Eastern Sierra Market Opportunities

Southwest does not serve any of the identified ski destinations and has never done so. They continue to focus on high daily frequency with large capacity, mainline aircraft. There has been discussions for Southwest to change their model to be able to operate with less-than-daily service in smaller markets. However, their current contracts restrict them from doing so. Until Southwest's model changes, Eastern Sierra service is unlikely.

**TABLE 5.17 Southwest Airlines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| Chicago, IL (MDW) | 1,672 | 31,865 | 209 | 153 | 3 | 1 | 2 |
| Las Vegas, NV | 231 | 29,713 | 195 | 153 | 0 | (2) | 2 |
| Baltimore, MD | 2,271 | 29,358 | 192 | 153 | 3 | 2 | 2 |
| Denver, CO | 781 | 28,093 | 182 | 154 | 3 | 1 | 2 |
| Dallas, TX (DAL) | 1,284 | 26,195 | 175 | 150 | 5 | 2 | 3 |
| Phoenix, AZ (PHX) | 482 | 24,816 | 163 | 152 | (0) | (1) | 1 |
| Houston, TX (HOU) | 1,461 | 22,868 | 152 | 151 | 5 | 2 | 2 |
| Atlanta, GA | 1,946 | 17,815 | 116 | 153 | 0 | (2) | 3 |
| Los Angeles, CA | 256 | 17,642 | 120 | 147 | 0 | 0 | (0) |
| Orlando, FL (MCO) | 2,252 | 17,365 | 114 | 153 | 1 | (1) | 1 |
| Oakland, CA | 185 | 16,123 | 108 | 150 | 6 | 4 | 2 |
| San Diego, CA | 350 | 15,306 | 101 | 151 | 13 | 11 | 2 |
| **Total all markets** | | **548,492** | **3,647** | **150** | **4** | **2** | **2** |

**TABLE 5.18 Southwest Airlines – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| Boeing 737-700 | 143 | 2,802 | 2,545 | 10 |
| Boeing 737-800 | 175 | 780 | 588 | 33 |
| Boeing 737-Max 8 | 175 | 64 | 0 | 100 |
| Boeing 737-300 | 137-143 | 0 | 432 | (100) |
| **Total all aircraft** | | **3,647** | **3,566** | **2** |

*SOURCE: Diio Mi; as of 11/1/2017*

> *"Southwest does not serve any of the identified ski destinations and has never done so. Until Southwest's model of high daily frequency with large capacity, mainline aircraft changes, service to the Eastern Sierra region is unlikely."*

## Spirit Airlines

Spirit has been actively growing their presence in point-to-point markets. Spirit plans significant growth, but their current growth has been focused in larger markets that can support daily service using aircraft with high density seating. In general, Spirit service has been less than stable with their fleet being redeployed to markets perceived to offer a greater opportunity.

### Hub/Focus Cities

Spirit primarily serves leisure markets with a focus on Fort Lauderdale, Orlando-International, Las Vegas, Detroit, Chicago-O'Hare, Baltimore, Los Angeles, Dallas-Fort Worth and Atlanta. **Table 5.19** compares average departures and seats in January 2018 with the prior year. Overall Spirit's seats and departures will increase 15 and 11 percent, respectively. The most significant percentage increases (greater than 20 percent) will occur in the Orlando-International, Baltimore, Tampa, Houston-Intercontinental and Boston markets.

### Aircraft in Use

Spirit operates the Airbus A319, A320 and A321 aircraft with half of departures on the 178- to 182-seat A320 aircraft (**Table 5.20**). Spirit continues to grow its fleet significantly, with a doubling in capacity expected by 2020. This growth is coming predominately in the largest sized aircraft, the Airbus A320 and A321. However, Spirit plans to increase the number of A319 aircraft and begin serving mid-size markets previously not considered a fit with Spirit's business model.

### Eastern Sierra Market Opportunities

Spirit does not serve ski destinations. Spirit is one of the fastest growing airlines and has been actively growing its presence in point-to-point markets. Spirit plans significant growth, but their current growth has been focused mainly in larger markets such as Chicago, Dallas, Detroit and Las Vegas capable of supporting daily point-to-point service on aircraft with high density seating. Under Spirit's current operating model, Eastern Sierra service is unlikely.

> *"Spirit plans significant growth, but their current growth has been focused in larger markets that can support daily service using aircraft with high density seating."*

**TABLE 5.19 Spirit Airlines – Departures and Seats by Hub**

| Hub/ Focus Market | Distance to MMH | January 2018 (Avg. Daily) | | | % Change YOY | | |
|---|---|---|---|---|---|---|---|
| | | Seats | Depart-ures | Seats/ Dept. | Seats | Depart-ures | Seats/ Dept. |
| **Fort Lauderdale, FL** | 2,391 | 11,881 | 62 | 193 | 4 | 2 | 3 |
| **Orlando, FL (MCO)** | 2,252 | 6,391 | 35 | 184 | 26 | 28 | (1) |
| **Las Vegas, NV** | 231 | 6,258 | 34 | 184 | 17 | 10 | 7 |
| **Detroit, MI** | 1,898 | 5,535 | 29 | 188 | 14 | 13 | 1 |
| **Chicago, IL (ORD)** | 1,664 | 4,601 | 26 | 177 | 5 | 4 | 1 |
| **Baltimore, MD** | 2,271 | 3,746 | 21 | 175 | 38 | 33 | 4 |
| **Los Angeles, CA** | 256 | 3,726 | 22 | 169 | (13) | (15) | 3 |
| **Dallas, TX (DFW)** | 1,272 | 3,664 | 20 | 183 | 19 | 10 | 8 |
| **Atlanta, GA** | 1,946 | 3,524 | 20 | 174 | 10 | 7 | 3 |
| **Tampa, FL** | 2,200 | 3,379 | 19 | 179 | 45 | 29 | 12 |
| **Houston, TX (IAH)** | 1,447 | 3,321 | 17 | 195 | 28 | 13 | 13 |
| **Fort Myers, FL** | 2,289 | 2,999 | 16 | 186 | 18 | 14 | 4 |
| **Boston, MA** | 2,526 | 2,460 | 14 | 170 | 30 | 31 | (1) |
| **Total all markets** | | **88,970** | **488** | **182** | **15** | **11** | **3** |

**TABLE 5.20 Spirit Airlines – Aircraft in Use**

| Aircraft Type | Seating Capacity | Average Daily Departures | | |
|---|---|---|---|---|
| | | January 2018 | January 2017 | % Change |
| **Airbus A320** | 178-182 | 244 | 240 | 2 |
| **Airbus A319** | 145 | 134 | 132 | 2 |
| **Airbus A321** | 218-228 | 110 | 68 | 62 |
| **Total all aircraft** | | **488** | **440** | **11** |

*SOURCE: Diio Mi; as of 11/1/2017*

## Other Airlines

Other airline opportunities may arise such as pro-rate flying on regional airlines like SkyWest Airlines or scheduled charter service on evolving carriers such as JetSuiteX, Elite Airways or Via Air. SkyWest operates all pro-rate service with the CRJ-200 and, due to profitability impacts of longer haul flights, typically operates pro-rate at stage lengths under 700 miles. Only two ski destinations are operated with CRJ-200 aircraft, HDN and MTJ, which are not directly comparable operationally to MMH. SkyWest would need to conduct an aircraft operational analysis to determine if the CRJ-200 can operate at MMH. If the aircraft can operate at MMH, SkyWest would be a short-term opportunity for Phoenix (American Airlines pro-rate) and Salt Lake City (Delta Air Lines pro-rate). However, SkyWest has indicated that further growth of pro-rate for Delta is unlikely to occur.

Currently, SkyWest does not have a pro-rate agreement with Alaska Airlines but both airlines have shown interest. Once that is in place, Portland and Seattle also become opportunities if the CRJ-200 can operate at MMH. This is considered a long-term opportunity due to the lack of an existing pro-rate agreement.

Via Air serves one ski destination: HDN to Austin and Kansas City. Much of Via Air's service is to/from Branson, MO, to larger destination markets. They are also an Essential Air Service (EAS) provider. They operate service with the Embraer Brasilia 120 turboprop aircraft and the Embraer 145 regional jet. Via Air's plans for expansion at ski destinations is unknown.

Without a Federal Inspection Station (FIS), international service is limited to international airports that offer pre-clearance facilities. The only international service provided at a ski destination airport is EGE to Toronto, Canada, provided by Air Canada with the Airbus A319. The Mammoth Lakes market would have to grow substantially for an international carrier to consider nonstop service.

# 6 Economic Impact Analysis

This section reviews the economic impact of visitor spending from air service at MMH for the region. Mammoth Lakes Tourism contracts with MeringCarson, an advertising firm located in Sacramento, CA, to create a quantitative research survey of visits in the Mammoth Mountain database. The most recent study was conducted in August 2016 and was based on 4,340 responses for travel during 2015 and 2016. This survey was used as the baseline data for the economic impact analysis.

## Economic Impact from Visitor Spending

The August 2016 study by MeringCarson analyzed the spending habits of visitors to the Mammoth Lakes area. By combining the results of this study with US Department of Transportation (DOT) data, the economic impact (visitor spending only) was calculated for each air service route by season.

### Visitor Spending by Traveler Type

One of the key breakdowns of the MeringCarson study was the difference in spend for travelers that arrive via air travel versus driving. **Table 6.1** shows the total economic spend per trip by category. This amount includes all people who travel together on a trip, not on a per person basis.

Overall, air visitors spend a total of $2,177 per trip including the cost of transportation to Mammoth (i.e., airfare). Excluding the cost of air travel, air visitors spend $1,796 per trip. Conversely, drive visitors spend a total of $1,657 per trip including the cost of transportation to Mammoth and $1,543 per trip excluding transportation. The 16 percent higher spend for air travelers (excluding transportation) predominately revolved around dining out, transportation within the Mammoth area, shopping and groceries.

While the average spend per trip for air travelers is 16 percent higher than drive trips, the variance is much larger when the average travel party size is taken into account (**Table 6.2**). On average, there were 2.9 travelers represented per air trip, while there were 4.1 travelers represented per drive trip. The average trip spend per person for air trips was $751 including transportation to Mammoth and $619 per person excluding the cost of transportation. The average trip spend per person for drive trips to Mammoth was $404 including transportation

**TABLE 6.1 Economic Impact Per Trip by Traveler Type 2015/2016**

| Expense Type | Air Trip | Drive Trip | % Variance |
|---|---|---|---|
| Lodging | $728 | $709 | +3% |
| Dining Out | $331 | $257 | +29% |
| Groceries | $165 | $128 | +29% |
| Outdoor Activities | $324 | $313 | +4% |
| Shopping | $122 | $90 | +36% |
| Entertainment | $17 | $8 | +113% |
| Transportation while in Mammoth | $57 | $15 | +280% |
| Other | $52 | $23 | +126% |
| Transportation to Mammoth | $381 | $114 | +234% |
| Total Expense per Trip | **$2,177** | **$1,657** | **+31%** |
| Total Expense per Trip (excl. Transportation to Mammoth) | **$1,796** | **$1,543** | **+16%** |

SOURCE: MeringCarson

**TABLE 6.2 Average Spend Per Person**

| Item | Air Visitor | Drive Visitor | % Variance |
|---|---|---|---|
| Total Expense per Trip | $2,177 | $1,657 | +31% |
| Total Expense per Trip (excl. Transportation to Mammoth) | $1,796 | $1,543 | +16% |
| Average Travel Party Size | 2.9 | 4.1 | (-29%) |
| Trip Spend/Person | **$751** | **$404** | **+85%** |
| Trip Spend/Person (excl. Transport) | **$619** | **$376** | **+65%** |

SOURCE: MeringCarson

> *"The average air visitor, excluding transportation, spent 65 percent more per person than a visitor that arrives by car. Because of this, it is preferable to have a larger percentage of visitors arrive via air than by car."*

to Mammoth and $376 per person excluding the cost of transportation.

The average air visitor, excluding transportation, spent 65 percent more per person than a visitor that arrives by car. Since the number of overnight visitors to Mammoth could be limited by the number of available beds, it is in the best interest of the community at large to have a larger percentage of visitors arrive via air than by car.

While the seasons in Mammoth can best be broken down into winter ski-season, summer season and shoulder seasons, for simplicity this analysis identifies two periods, winter peak season and off-peak season. While there are some changes in demand between the shoulder and summer season, the average spend per traveler is very similar during both periods and much lower than the winter peak season. This is in large part due to higher costs of accommodations and outdoor activities, especially lift tickets, which are much more expensive. The winter peak season is defined as November through April, while the off-peak season is defined as May through October as shown in **Table 6.3**.

**Table 6.4** shows visitor spend by season. Compared to the annual average, the average winter visitor spends 17 percent more, while the rest of the year the average visitor spends 23 percent less than the annual average. The adjusted spend for each air or drive visitor is calculated using the averages from **Table 6.2** and removes the cost of transportation to Mammoth since that revenue is typically not realized in the local economy.

**TABLE 6.3 Season By Month**

| Month | Season |
|---|---|
| January | Winter Peak |
| February | Winter Peak |
| March | Winter Peak |
| April | Winter Peak |
| May | Off-Peak |
| June | Off-Peak |
| July | Off-Peak |
| August | Off-Peak |
| September | Off-Peak |
| October | Off-Peak |
| November | Winter Peak |
| December | Winter Peak |

**TABLE 6.4 Visitor Spend By Season**

| Visitor Spend | Winter Peak | Off-Peak |
|---|---|---|
| Spend by Season Variance to Annual Average | 117% | 77% |
| Adjusted Spend for Air Visitor | $727 | $480 |
| Adjusted Spend for Drive Visitor | $442 | $292 |

SOURCE: MeringCarson

## Air Travelers to Mammoth Lakes Area

To determine the annual impact of air service at Mammoth, the number of passengers that flew into and out of MMH for the year ended June 30, 2017, was reviewed. **Table 6.5** shows the inbound passengers by route and by season using the US DOT's T-100 data which summarizes by market the number of flights, passengers and seats by month for air carriers serving the United States. Overall, there were a total of 22,213 inbound passengers for the year ended June 30, 2017, with approximately 16,130 (73 percent) of those passengers during the six-month winter peak season. The rest of the year made up the other 27 percent, or 6,083 passengers.

Since this section is designed to identify the economic impact of the inbound traveler to the Mammoth Lakes area, the local resident who originates from MMH was removed from the analysis. Point-of-origin was determined using US DOT origin and destination data. Approximately 25 percent of passengers originate their travel from MMH. This means that 75 percent of passengers originate elsewhere (e.g., Los Angeles, San Diego, New York). This point-of-origin data is then used to calculate the inbound passengers using the total passengers from **Table 6.5** and removing the passengers that have a point-of-origin of MMH, resulting in 16,501 inbound annual passengers to the Mammoth Lakes area (shown in **Table 6.6)**.

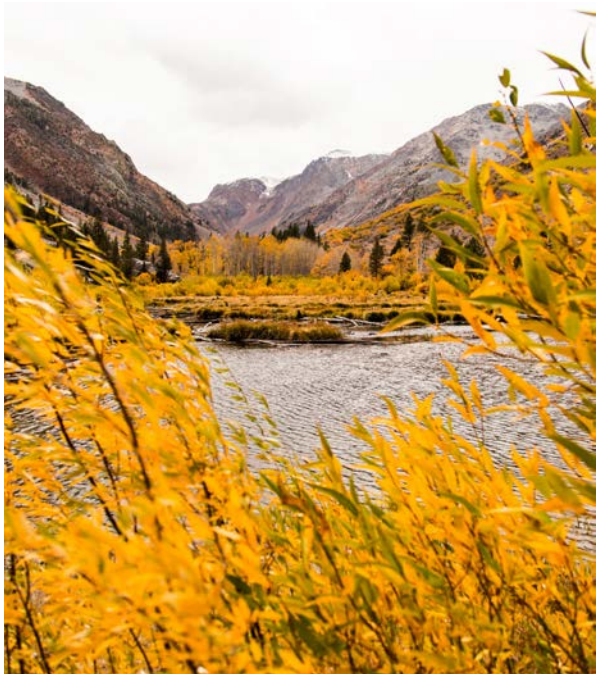


**TABLE 6.5 MMH Passengers By Season and Route**

| Destination | Winter Peak | Off-Peak | Total Passengers |
|---|---|---|---|
| **Los Angeles, CA** | 9,403 | 6,083 | 15,486 |
| **San Francisco, CA** | 3,046 | 0 | 3,046 |
| **San Diego, CA** | 2,835 | 0 | 2,835 |
| **Burbank, CA** | 847 | 0 | 847 |
| **Total Passengers** | **16,130** | **6,083** | **22,213** |

**TABLE 6.6 MMH Passengers Originating Outside of Mammoth (Inbound)**

| Destination | Point-Of-Origin at MMH | Winter Peak | Off-Peak | Total Passengers |
|---|---|---|---|---|
| **Los Angeles, CA** | 28% | 6,727 | 4,352 | 11,079 |
| **San Francisco, CA** | 21% | 2,408 | 0 | 2,408 |
| **San Diego, CA** | 16% | 2,380 | 0 | 2,380 |
| **Burbank, CA** | 25% | 633 | 0 | 633 |
| **Total Passengers** | **25%** | **12,148** | **4,352** | **16,501** |

*SOURCE: Diio Mi; Year Ended June 30, 2017; NOTE: Market average point-of-origin data used for Burbank*

> *"Approximately 25 percent of passengers originate their travel from MMH, with 75 percent of passengers originating elsewhere (i.e., Mammoth Lakes visitor)."*

## Economic Impact by Route for MMH

Using the per passenger average spend for air travelers by season from **Table 6.2** and the inbound passengers by season in **Table 6.6**, the estimated annual impact from visitor spending for inbound travelers to the Mammoth Lakes area can be calculated (**Table 6.7**). An estimated $10.9 million in annual spend is generated from inbound travelers to the Mammoth Lakes area, with approximately 81 percent, ($8.8 million) of that generated during the winter peak season.

Key take-aways from this analysis include:

- The average air visitor spends 65 percent more per person in the Eastern Sierra local economy than the average drive visitor.
- Seventy-five percent of passengers using MMH are visitors to the area.
- Air visitors to MMH injected over $10.9 million in spending into the local economy in the year ended June 30, 2017.

This analysis only includes the visitor spending portion of the economic impact on the Mammoth Lakes area. The true economic impact is much larger than just visitor spending. Many jobs associated with the hospitality and tourism industry in Mammoth Lakes are supported by these visitors and the annual salaries and wages associated with those jobs as well as the local spending of these workers and their families should be included in a full economic impact analysis. Business investments and the local spending by those businesses driven by the volume of tourism from these flights would also be included. Often the true economic impact can be as much as double the total direct visitor spend.


**TABLE 6.7 Economic Impact by Season by Route**

| Destination | Winter Peak | Off-Peak | Total Passengers |
|---|---|---|---|
| **Los Angeles, CA** | $4,890,479 | $2,088,783 | $6,979,262 |
| **San Francisco, CA** | $1,750,959 | $0 | $1,750,959 |
| **San Diego, CA** | $1,730,273 | $0 | $1,730,273 |
| **Burbank, CA** | $460,176 | $0 | $460,176 |
| **Total Passengers** | **$8,831,887** | **$2,088,783** | **$10,920,670** |

This visitor spending analysis suggests that the investment in new nonstop air service can produce strong returns for the local community. The analysis suggests that an effort to attract a new year-round market could see a similar return of the nearly $7 million in spending produced by Alaska Airlines' MMH-Los Angeles service. A winter peak seasonal market addition would likely have an impact similar to the $1.7 million impact that United Airlines' San Francisco service and Alaska Airlines' San Diego service have had.

## Return on Investment of Air Service Agreements

The current service at MMH is supported financially by the community via air service agreements with each airline. These agreements are designed so that the community can financially support service that might otherwise not be economically viable. The air service agreements are set up as minimum revenue guarantees. Minimum revenue guarantees include a target revenue amount per flight. Over the course of the air service period (typically per month or per season), the total revenue is calculated and compared to the total target revenue. If more flown revenue is generated than the target revenue, then there is no payment to the airline. If the total revenue generated is less than the target revenue, the community is responsible for making up the difference to the airline up to the agreed upon amount.

For the 2016/2017 season, there were three separate agreements in place:

- Alaska Airlines: Los Angeles International Airport and San Diego International Airport
- JetSuiteX: Burbank Bob Hope Airport
- United Airlines: San Francisco International Airport

The contracts with JetSuiteX and United Airlines only covered the winter season, from November through early April. Alaska Airlines' agreement was for both summer and winter service. It is likely that any new service at MMH would also have an air service agreement to backstop the start-up risk of the service, and may potentially be in place permanently, not just to cover start-up. Because minimum revenue guarantees are important to MMH, it is imperative that the relative return on investment of these agreements is understood.

**Table 6.8** provides the air service agreement payments that were made from the Mammoth Lakes community to each airline for the year ended June 30, 2017. Overall, $1,855,260 in payments were made to the airlines, with Alaska Airlines accounting for the majority of that (69 percent or $1,282,366). While the off-peak service represented more than 41 percent of the total air service payments, off-peak inbound passengers reflected just 26 percent of the total passengers to the Mammoth area.

### Winter Air Service Agreements

**Table 6.9** breaks down the number of passengers and the payment per passenger for each airline by season. Overall, the community paid $89.95 per inbound passenger during the winter 2016/2017 season. As shown in **Table 6.2**, the total visitor spend in the Mammoth Lakes area for an inbound passenger is $619. Even if it is assumed that a majority of the passengers today are deciding to fly instead of drive, and therefore would visit the Mammoth area regardless, **Table 6.2** also showed that the average air visitor spends at least $243 more than the average drive visitor to Mammoth.

While the overall average cost of the air service agreements for the winter peak season was $89.95 per inbound passenger, the numbers vary greatly from airline to airline. Alaska has a significantly lower cost per passenger, at just $56.82 per inbound passenger, while JetSuiteX is substantially higher per passenger at $237.40. United

**TABLE 6.8 MMH Air Service Agreement Payments**

| Airline | Winter Peak | Off-Peak | Total Payments |
|---|---|---|---|
| **Alaska Airlines** | $513,361 | $769,005 | $1,282,366 |
| **JetSuiteX** | $150,273 | - | $150,273 |
| **United Airlines** | $422,621 | - | $422,621 |
| **Total Payments** | **$1,086,255** | **$769,005** | **$1,855,260** |

**TABLE 6.9 MMH Payments Per Inbound Passenger**

| Airline | Inbound Passengers | Payments | Cost Per Inbound Passenger |
|---|---|---|---|
| | **Winter-Peak Season** | | |
| **Alaska Airlines** | 9,035 | $513,361 | $56.82 |
| **JetSuiteX** | 633 | $150,273 | $237.40 |
| **United Airlines** | 2,408 | $422,621 | $175.51 |
| **Total Payments** | **12,076** | **$1,086,255** | **$89.95** |
| | **Off-Peak Season** | | |
| **Alaska Airlines** | 4,352 | $769,005 | $176.70 |
| **Total Payments** | **4,352** | **$769,005** | **$176.70** |

*SOURCE: Mammoth Lakes Tourism; Year Ended June 30, 2017*

Airlines falls between the two, but still nearly double the average at $175.51.

Due to the relative drive and demand from the Los Angeles Basin to Mammoth Lakes, it can be assumed that many of the passengers on Alaska or JetSuiteX would have driven to Mammoth Lakes for their trip if no air service was available. Even in that case, Alaska's cost of just $56.82 per passenger is substantially lower than the average incremental gain by having visitors arrive by air (as identified in **Table 6.3** at $285 per visitor difference). This means that for every visitor that Alaska brings into the Mammoth area, they are at a minimum producing an additional $228 in spend in the community than it cost to bring them in if they are flying instead of driving. For Alaska passengers that would otherwise have not made the trip, there is a net incremental spend of over $670 per person. In all respects, the Alaska Airlines air service agreement is a very positive economic contributor to the Mammoth Lakes area.

JetSuiteX's service, however, has a payment per passenger of $237.40, equating to an incremental economic benefit to the community of just $48 per visitor if they would have still driven to Mammoth Lakes versus flying. If those passengers would have not made the trip without air service, the economic impact per visitor is much higher at $489. The makeup of the JetSuiteX passenger should be studied in more detail to determine if these passengers would otherwise have driven to Mammoth or if they were true incremental visitors.

United's service from San Francisco had a total of $422,621 in payments under its agreement. With 2,408 inbound passengers, it cost $175.51 per visitor on United. Since the San Francisco Bay Area is not commonly thought of as a drive market for Mammoth Lakes visitors and half of the passengers on the San Francisco flights are originating travel from other markets (such as Newark, Seattle or Boston), it can be assumed that the majority of passengers are incremental visitors to the Mammoth Lakes area, and are therefore valued at the full $727 spend for an incremental winter visitor. While it cost $175.51 to bring each visitor to Mammoth, there is a net economic gain of $551 per visitor on the United Airlines service.

## Summer Air Service Agreements

**Table 6.9** also covered the off-peak payments per inbound passenger for Alaska Airlines. For the off-peak months for the year ended June 30, 2017, Alaska received a total payment of $769,005 for 4,352 inbound passengers. This resulted in a $176.70 payment per inbound passenger during the off-peak season. Since the off-peak visitor spends significantly less than the winter visitor, the threshold for profitable passengers is different during the off-peak season. As shown in **Table 6.3**, the average off-peak air visitor spends $480 compared to just $292 for the drive visitor during the off-peak season. Thus the total visitor spend for these 4,352 off-peak passengers is just under $2.1 million ($480 multiplied by 4,352 visitors), $1.3 million more than the minimum revenue guarantee payment to Alaska. However, if air visitors were merely diversion from potential drive visitors, then the incremental spend of the air visitor versus drive visitors would be essentially equal to the minimum revenue guarantee payments to Alaska.

*"Even assuming that many of the Los Angeles travelers would have driven to Mammoth Lakes for their trip if no air service was available, the cost per passenger is substantially lower than the average incremental gain by having visitors arrive by car."*

## Return on Investment

**Table 6.10** shows the average return in visitor spending per dollar of minimum revenue guarantee payment, both on a total spend basis and on an incremental spend basis. The total spend return assumes the air visitor spend is all incremental while the incremental return assumes just the incremental spend of the air visitor compared to a drive visitor (in other words, it assumes all air visitors would have driven if air service were not available).

While the total visitor spend per dollar of minimum revenue guarantee paid has a strong return on investment of $5.48 of visitor spending for every dollar paid in minimum revenue guarantee, the incremental scenario assuming air visitors would be replaced by drive visitors suggests much lower returns for the JetSuiteX and the Alaska Airlines off-peak service. The United service is excluded from this concern because, as stated above, it is assumed most of United's traffic is incremental and would not drive. While the JetSuiteX and Alaska off-peak impacts deserve greater study, it's likely that the true impact is somewhere in between these two scenarios.

There are several key take-aways from this return-on-investment analysis:

- Alaska Airlines winter service is the most economical use of minimum revenue guarantee funds, at just $56.82 in subsidies per passenger.
- JetSuiteX has a relatively high cost per inbound passenger at $237.40 and would only be economical if the majority of the passengers would otherwise not travel to Mammoth Lakes without air service.

**TABLE 6.10 Return On Investment of Air Visitor Spend Versus Minimum Revenue Guarantee (MRG)**

| Airline | MRG Cost Per Visitor | Average Air Visitor Spend | Total Return Per MRG $ | Incremental Spend Per Air Visitor | Incremental Return Per MRG $ |
|---|---|---|---|---|---|
| **Winter-Peak Season** | | | | | |
| **Alaska Airlines** | $56.82 | $727 | $12.79 | $285 | $5.02 |
| **JetSuiteX** | $237.40 | $727 | $3.06 | $285 | $1.20 |
| **United Airlines** | $175.51 | $727 | $4.14 | $285 | $1.62 |
| **Off-Peak Season** | | | | | |
| **Alaska Airlines** | $176.70 | $480 | $2.72 | $188 | $1.06 |
| **Total** | **$112.93** | **$619** | **$5.48** | **$376** | **$3.33** |

- During the winter, approximately $1.1 million in payments were made to the airlines, which generated over $8.8 million in direct visitor spending benefits in the community for an eight-to-one return for every minimum revenue guarantee dollar paid.
- During off-peak months, the cost for each off-peak visitor is much higher but still creates a net positive impact on the community if the majority of air visitors are considered incremental.
- Overall, the minimum revenue guarantee program returned between $3.33 and $5.48 in visitor spending for every dollar of minimum revenue guarantee paid.
- The off-peak minimum revenue guarantee program and the minimum revenue guarantee with JetSuiteX deserve more review to determine how much of the air visitor traffic is truly incremental.

*"Alaska Airlines winter service is the most economical use of minimum revenue guarantee funds while off-peak and JetSuiteX needs more review to determine incremental benefit."*

# 7 Peer Review

This section provides a peer review of the report prepared by Wadell Engineering Corporation ("Wadell") for Bishop Airport (BIH). The report, titled ***Steps Toward Bishop Airport Part 139 Commercial Airline Service***, evaluated BIH's ability to serve as a base for scheduled airline service and was published in June 2017. The purpose of the report was to evaluate the feasibility of BIH being served by Allegiant Air and used as a bad weather alternative to MMH.

*"Part 139 identifies four classes of certificated airports that are based on the type and size of commercial aircraft the airport may accommodate."*

This section is divided into two sub-sections. The first sub-section describes the process, facilities and personnel required for BIH to be allowed to be used for scheduled passenger service. The conclusions in the Wadell report are evaluated based upon Mead & Hunt's experience at other airports with scheduled airline service. The second sub-section evaluates the likelihood of airlines using BIH routinely as a bad weather alternative to MMH. This analysis was prepared with readily available data. A site visit was not conducted. Assumptions that were made about facilities or conditions are documented.

## Becoming Part 139 Compliant

FAA regulations state that scheduled commercial aircraft with 10 seats or more cannot operate into an airport unless the airport is certificated in compliance with Federal Aviation Regulations Part 139. Part 139 certification means that an airport has the required infrastructure, services, and policies and procedures in place for scheduled commercial aircraft to safely operate. Once the airport becomes Part 139 compliant, the FAA will require continued compliance with all applicable rules and regulations. This may require additional investment in safety and security measures as well as upgraded facilities over time. The following assessment is a peer review of the Wadell report's analysis and conclusions.

### Airport Class

Part 139 identifies four classes of certificated airports. The respective class of airport is based on the type and size of commercial aircraft the airport may accommodate. Section 139.5 describes the four classes of airports as follows:

- **Class I Airport:** An airport that is certified to serve scheduled operations of large air carrier aircraft (i.e., having 31 or more passenger seats) that can also serve unscheduled passenger operations of large air carrier aircraft and/or scheduled operations of small air carrier aircraft (having more than nine passenger seats but less than 31).
- **Class II Airport:** An airport certified to serve scheduled operations of small air carrier aircraft and the unscheduled passenger operations of large air carrier aircraft. A Class II airport cannot serve scheduled large air carrier aircraft.

- **Class III Airport:** An airport certified to serve scheduled operations of small air carrier aircraft. A Class III airport cannot serve scheduled or unscheduled large air carrier aircraft.
- **Class IV Airport:** An airport certified to serve unscheduled passenger operations of large air carrier aircraft. A Class IV airport cannot serve scheduled large or small air carrier aircraft.

Part 139 requires the FAA to issue Airport Operating Certificates (AOC) to airports that:

- Serve scheduled and unscheduled air carrier aircraft with more than 30 seats (large air carrier aircraft)
- Serve scheduled air carrier operations in aircraft with more than nine seats but less than 31 seats (small air carrier aircraft)

AOCs serve to enhance safety in air transportation. To obtain a certificate, an airport must agree to meet certain airport management, operational and safety standards. Before Part 139 requirements can be outlined, BIH's class must be determined. For the purposes of this peer review, it is assumed that BIH would be considered a Class I Airport, an airport with scheduled operations of large air carrier aircraft such as the Bombardier Q400, CRJ-700 and Airbus A319. Requirements to meet the Class I Airport certification follows.

## Airport Operating Manual

The FAA requires that each Part 139 certificate holder (airport) must create, adopt and comply with an Airport Certification Manual (ACM). This manual details compliance regulation for Part 139 and must be kept current at all times. The elements of the manual are defined in **Table 7.1** on the next page.

A certificate is issued when the airport applicant:

- Submits written documentation that an airline will begin service on a certain date.
- Submits an application including the ACM which meets FAA requirements.
- The FAA, after investigation, finds the airport is properly and adequately equipped and able to provide a safe airport operating environment.

The Wadell report estimates that preparation of the ACM would cost approximately $75,000 and take four months to finalize the draft for submittal to the FAA. Based upon Mead & Hunt's experience, the cost and preparation time are the correct order of magnitude.

As can be seen in the list in **Table 7.1**, next page, the ACM must contain a number of specific plans to address various aspects of safety and security. Only elements with potential cost or operational issues are discussed. Otherwise, it can be assumed that these requirements can be met without any costs beyond that of the original preparation of the ACM.

**TABLE 7.1 Required Airport Certification Manual Elements**

| Item # | Manual Elements | Airport Certification Class | |
|---|---|---|---|
| | | Class I-III | Class IV |
| 1 | Lines of succession of airport operational responsibility | X | X |
| 2 | Each current exemption issued to the airport from the requirements of this part | X | X |
| 3 | Any limitations imposed by the Administrator | X | X |
| 4 | A grid map or other means of identifying locations and terrain features on and around the airport that are significant to emergency operations | X | X |
| 5 | The location of each obstruction required to be lighted or marked within the airport's area of authority | X | X |
| 6 | A description of each movement area available for air carriers and its safety areas, and each road described in § 139.319(k) that serves it | X | X |
| 7 | Procedures for avoidance of interruption or failure during construction work of utilities serving facilities or navaids that support air carrier operations | X | |
| 8 | A description of the system for maintaining records, as required under § 139.301 | X | X |
| 9 | A description of personnel training, as required under § 139.303 | X | X |
| 10 | Procedures for maintaining the paved areas, as required under § 139.305 | X | X |
| 11 | Procedures for maintaining the unpaved areas, as required under § 139.307 | X | X |
| 12 | Procedures for maintaining the safety areas, as required under § 139.309 | X | X |
| 13 | A plan showing the runway and taxiway identification system, including the location and inscription of signs, runway markings, and holding position markings, as required under § 139.311 | X | X |
| 14 | A description of, and procedures for maintaining, the marking, signs, and lighting systems, as required under § 139.311 | X | X |
| 15 | A snow and ice control plan, as required under § 139.313 | X | |

*SOURCE: FAA Airport Certification Manual*

**TABLE 7.1 Required Airport Certification Manual Elements (Continued)**

| Item # | Manual Elements | Airport Certification Class | |
|---|---|---|---|
| | | Class I-III | Class IV |
| 16 | A description of the facilities, equipment, personnel, and procedures for meeting the aircraft rescue and firefighting requirements, in accordance with §§ 139.315, 139.317 and 139.319 | X | X |
| 17 | A description of any approved exemption to aircraft rescue and firefighting requirements, as authorized under § 139.111 | X | X |
| 18 | Procedures for protecting persons and property during the storing, dispensing, and handling of fuel and other hazardous substances and materials, as required under § 139.321 | X | X |
| 19 | A description of, and procedures for maintaining, the traffic and wind direction indicators, as required under § 139.323 | X | X |
| 20 | An emergency plan as required under § 139.325 | X | X |
| 21 | Procedures for conducting the self-inspection program, as required under § 139.327 | X | X |
| 22 | Procedures for controlling pedestrians and ground vehicles in movement areas and safety areas, as required under § 139.329 | X | |
| 23 | Procedures for obstruction removal, marking, or lighting, as required under § 139.331 | X | X |
| 24 | Procedures for protection of navaids, as required under § 139.333 | X | |
| 25 | A description of public protection, as required under § 139.335 | X | |
| 26 | Procedures for wildlife hazard management, as required under § 139.337 | X | |
| 27 | Procedures for airport condition reporting, as required under § 139.339 | X | X |
| 28 | Procedures for identifying, marking, and lighting construction and other unserviceable areas, as required under § 139.341 | X | |
| 29 | Any other item that the Administrator finds is necessary to ensure safety in air transportation | X | X |

*SOURCE: FAA Airport Certification Manual*

### Records and Personnel

On-going training of various staff must be provided and documented. Sufficient, qualified staff must be available and equipped with adequate resources to comply with Part 139 requirements. An airport is required to maintain all training and certain other records for specified periods of time. For example, these records would include, but not be limited to, all personnel training, airport self-inspections, and accident and incident reports. These records must be maintained in the manner prescribed in the applicable section of Part 139, and as authorized by the Airport Certification Safety Inspector. These records must be made available during a FAA inspection.

BIH would need to employ, at a minimum, one new full-time administrative staff person to share in the tasks of managing the airport and operations. Depending on how BIH wishes to proceed with meeting Aircraft Rescue and Fire Fighting (ARFF) requirements and the frequency of flights, it is possible that a new part- or full-time ARFF person would be required (see ARFF discussion on page 7.7). For law enforcement support, it is assumed that BIH would negotiate a contract with the County Sheriff or Bishop Police to provide patrols of BIH and law enforcement officer presence in the terminal building as needed (see security discussion).

As noted in the *Winter Operations* section on page 7.7, the Wadell report does not mention how snow removal operations would be staffed. If dedicated snow-removal equipment was acquired, existing airport ARFF and operations staff could be cross-trained to operate the snow-removal equipment. Alternately, this service could be contracted with another agency. Daily inspections of the airfield are a required component of Part 139 certification. Although not mentioned in the Wadell report, it seems reasonable that this task could be undertaken by ARFF or other airport staff as an additional duty.

The Wadell report identifies the need for an administrative staff person and local law enforcement involvement. Staffing for ARFF services are not explicitly mentioned in the Wadell report, but the potential of adding foam capabilities to a City of Bishop fire engine is mentioned.

At the initial level of service contemplated in the report, it is possible that management of BIH could continue with existing staff. However, if the volume of activity increased, at some point a full-time airport manager would be required.

### Paved Surfaces

BIH must maintain and promptly repair the pavement of each runway, taxiway, loading ramp and parking area on the airport available for airline use according to certain standards. BIH can define which areas on the airport are designed to accommodate airline aircraft. Paved areas must be kept clean of mud, dirt and other debris, sufficiently drained, and kept free of depressions to prevent ponding that obscures markings or impairs safe aircraft operations. Additionally, Part 139 airports must have skid-resistant runway pavement such as a porous friction course or grooved runway surface.

The Wadell report indicates that Runway 12/30 and its associated parallel and exit taxiways would likely be designated for airline use. The report concluded that the condition and strength of the pavement is adequate to accommodate aircraft as large as the Airbus A319. The terminal apron rehabilitation scheduled to be completed in November 2017 would provide parking for two airline aircraft. The Wadell report does not mention the need for a skid-resistant runway surface. However, available data indicates that BIH's main runway has a porous friction course that would meet Part 139 standards.

Runway 12/30 is 100 feet wide. FAA design standards for the Bombardier Q400 and Airbus A319 require a width of 150 feet. It is unknown whether the FAA would permit airline service with these aircraft to begin while the runway widening was designed and constructed.

Some taxiway design standards are based upon the width of the critical aircraft's main landing gear. The Bombardier Q400 has an unusually wide landing gear width because its main gear are connected to the wings rather than the fuselage. The Bombardier Q400 is in Taxiway Design Group 5. The standard FAA taxiway width for Taxiway Design Group 5 is 75 feet. The taxiways at BIH that would be used by airline aircraft are 50 feet wide. This is also the case at MMH. It is unknown if and when the FAA would require the taxiways to be widened to accommodate the Bombardier Q400.

The Wadell report concluded that the airfield pavement needed to accommodate airline service will be adequate following completion of the apron rehabilitation. With the exception related to the Bombardier Q400 discussed above, Mead & Hunt concurs with that assessment.

> ***"Runway 12/30 is 100 feet wide. FAA design standards for the Bombardier Q400 and Airbus A319 require a width of 150 feet."***


### Marking, Lighting and Signage

The Wadell report documented recent upgrades to BIH's lighting system and new paint markings throughout the airport. Based upon the available information, it appears that the markings, lighting and signage would meet Part 139 standards with one exception. It is expected that the FAA would require taxiway edge stripes to be added.

### Winter Operations

As noted in the Wadell report, BIH will need to create and implement a snow and ice control plan. The report listed several pieces of snow-removal equipment (e.g., snow plow) with a total cost of "as much as $1,500,000." The report notes that the FAA would be unlikely to fund this equipment purchase. However, the FAA might reimburse BIH once the airline service was established, if annual passenger enplanements exceeded 10,000. If BIH was only used as a bad weather alternate for MMH, passenger enplanements would not likely reach 10,000 annually.

No mention is made in the Wadell report of how snow-removal operations would be staffed. It appears likely that ARFF and other operations staff could be cross-trained to operate the snow-removal equipment. The report does note the potential to use County-owned equipment to clear the airport. Presumably this would be done on a contractual basis. Staffing costs would need to be calculated to determine the ongoing operational costs of snow removal. Given the need to clear the airfield to meet airline schedules, overtime costs for snow removal should be considered.

### ARFF

BIH is not currently required to provide ARFF services because it is a general aviation facility. If BIH were to become a scheduled commercial air service facility it would need to meet federal ARFF standards. The ARFF Index is determined by the average number of daily scheduled departures the airport has of each aircraft. If the airport has five or more daily scheduled operations in a particular group, that is the index. If the airport has a group that has less than five daily air carrier departures in the longest group, then the airport may reduce the index by one.

The following is a description of each ARFF Index:

- **Index A:** Includes aircraft less than 90 feet in length
- **Index B:** Includes aircraft at least 90 feet but less than 126 feet in length
- **Index C:** Includes aircraft at least 126 feet but less than 159 feet in length
- **Index D:** Includes aircraft at least 159 feet but less than 200 feet in length
- **Index E:** Includes aircraft at least 200 feet in length

All three of the aircraft mentioned as potential users of the airport (Bombardier Q400, Bombardier CRJ-700 and Airbus A319) fall under ARFF Index B. However, with less than five daily scheduled operations the airport could reduce their category to ARFF Index A. As noted in the Wadell report, at a minimum this would require one ARFF truck. The truck would require heated storage space. The Wadell report estimates the cost for the ARFF vehicle at $800,000 and a "fire station" at $400,000. The vehicle cost appears reasonable, but the building cost is too low to provide a fire station; however, the $400,000 estimated cost should be sufficient to provide a minimalist heated structure.

The report notes that the costs for this equipment is potentially reimbursable via a FAA grant. However, as noted earlier, if BIH is only used as a bad weather alternate for MMH, passenger enplanements would not likely reach the minimum volume needed to qualify for a FAA grant.

### Ground Service Equipment

No mention is made of the need for ground service equipment. Given the limited nature of passenger service, it is unlikely that the airlines would be willing to provide this equipment, at least initially. Therefore, BIH would need to provide the following: baggage carts, tugs, belt loader, a jet stair and a ground power unit.

### Controlling Pedestrian and Vehicle Access

A higher level of control of people and vehicles is required at a Part 139 airport than a general aviation airport. In the section on access control the Wadell report indicates that all fencing and gates required to support airline service are in place. However, elsewhere in the report it indicates that eight foot fencing may be required for security or wildlife exclusion. There are not explicit requirements for fencing and gates to comply with Part 139 requirements.

It is possible that the FAA would require modifications to existing fencing and gates, particularly in the vicinity of the passenger terminal. Potential modifications could include installation of taller fences (eight foot rather than six foot) or barbed wire on top of the fences. Relocation of gates to increase the separation from the terminal apron could also be required. The Wadell report estimated the cost of a wildlife exclusion fence at $1 million. While this is possible, it seems unlikely as a short-term project. More likely is an initial upgrading of the fencing/gates in the $10,000 cost range.

As noted in the Wadell report a major component of access control is administrative and operational. This includes tight control and accounting of electronic gate cards and monitoring of gates and other potential points of access. Although not explicitly mentioned in the Wadell report, it seems likely that staffing for these tasks could be undertaken by the additional administrative staff person and ARFF/operational staff assumed to be needed to meet Part 139 requirements.

### Wildlife Hazard Management

As noted in the Wadell report, Part 139 airports are required to have a wildlife hazard management plan. Data on wildlife hazards for this management plan could be satisfied with a site visit by the 139 inspector or may require preparation of a wildlife hazard assessment. The report estimated costs for preparation of a wildlife hazard management plan at $50,000. This cost appears low. Based upon Mead & Hunt's experience preparing these plans, the management plan can be expected to cost upwards of $80,000. An assessment would cost approximately $15,000 to $20,000.

As a potential wildlife management tool, the Wadell report estimates the cost of 25,000 feet of eight foot perimeter fence at about $1 million for design and construction. Although the need for this fence seems unlikely, the implied unit cost of $40 per linear foot appears low. A cost closer to $50 per linear foot would be more reasonable.

### Marking and Lighting

BIH would need to mark and, if appropriate, light:

- Each construction area and unserviceable area that is on or adjacent to any movement area or any other area of the airport on which air carrier aircraft may be operated;
- Each item of construction equipment and each construction roadway, which may affect the safe movement of aircraft on the airport; and
- Any area adjacent to a navigational aid (navaid) that, if traversed, could cause derogation of the signal or the failure of the navaid.

BIH must also provide procedures, such as a review of all appropriate utility plans prior to construction, for avoidance of damage to existing utilities, cables, wires, conduits, pipelines or other underground facilities.

The Wadell report indicates that standard practices will provide the necessary marking and lighting during construction projects. This is a reasonable response. The report also identified the many abandoned ex-military hardstands as an example of unserviceable areas near airfield pavement that would be used by airline aircraft. A nominal cost of $10,000 is suggested to mark these as unusable or install barricades. This also appears reasonable.

The only navaid on the BIH airfield is very high frequency omni-directional range station with distance measuring equipment (VOR/DME). This facility is located in an isolated area in the northeastern quadrant of the airfield. None of the runways or taxiways cross through this facilities exclusion area.

### Transportation Security Administration (TSA) Requirements

The TSA will need to be provided space in the terminal for screening of passengers and baggage. TSA will also need space for administrative offices, a break room and similar minor supporting uses. In general, TSA can be expected to provide all of the equipment needed. However, due to ongoing budgetary constraints, TSA may pressure BIH to pay for the outbound baggage screening equipment.

As the report indicates, TSA will need to be supported by uniformed officers. The report's assumption that this need would be filled through a contract with either the County Sheriff or Bishop Police is reasonable. Depending upon the requirements negotiated with BIH, this could be either an on-call service or a dedicated officer on-site. Although

there would be significant costs for this service, there are too many variables to provide an estimate.

The report notes that a security plan will need to be developed. It would need to identify areas of responsibility for TSA, BIH and others. Standard procedures for addressing a range of security-related events would need to be defined. The Wadell report is correct in anticipating that preparation of the security plan will be an iterative process that will involve repeated discussions and refinements to the plan. The estimated cost of $35,000 appears to be on the low end of the spectrum. The estimate of four months to prepare the plan is probably optimistic given the need to obtain concurrence on the layout of the terminal.

### Passenger Terminal

From aerial imagery the existing terminal building appears to have an area of about 6,000 square feet. The Wadell report anticipates use of a modular structure to provide the additional terminal space needed. This is a reasonable assumption. Modular structures are used to provide both temporary and permanent additions to passenger terminals. The Wadell report indicates that the modular structure would accommodate:

- Passenger check-in lobby
- Ticket counters
- Airline and TSA space (excludes TSA administrative offices)
- Passenger and baggage screening
- Passenger corridor to the departure lounge
- Restrooms on the secure side of screening

The size of the structure is not given, but the cost is estimated to be $800,000. Based upon Mead & Hunt's experience with similar one-gate terminals, the estimated costs appears to be about half of what the cost is likely to be. A more likely cost is $1.5 million. There may be additional costs to modify the existing terminal building.

The report indicates that the cost to purchase the modular terminal is grant eligible. As defined in the report the modular building would include airline counter and related space. These areas are not grant eligible nor are any non-public spaces that are remodeled in the existing terminal. The FAA may reimburse BIH once the airline service was established if annual passenger enplanements exceeded 10,000. However, if BIH was only used as a bad weather alternate for MMH, passenger enplanements would not likely reach 10,000 annually.

#### Automated Weather Observing System (AWOS) III

Current local weather information is required for airline services. To provide this information the existing Automated Surface Observation System (ASOS) will need to be replaced with an AWOS III with present weather reporting capability.

#### Environmental Documentation

Although not a capital cost, environmental documents will need to be prepared to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). It is assumed that these documents will address impacts associated with airline service and construction of required facilities.

#### Shuttle Buses

A key element of using BIH as a bad weather alternate to MMH is the need to transport passengers between BIH and Mammoth Lakes. Given that the passenger service is supported by a minimum revenue guarantee, it is unlikely that the airlines will fund this service. This service will require both an initial capital investment and ongoing operational costs. The service could be provided directly by a local entity or contracted with a third party. It is unknown which entity will absorb these costs. There are too many variables to estimate the costs for this service.

#### Conclusions

Based upon Mead & Hunt's experience, the Wadell report identifies all of the elements that would need to be considered in evaluating the feasibility of modifying BIH to meet Part 139 standards. Mead & Hunt supports the conclusion that BIH is physically capable of meeting Part 139 standards without requiring implausible modifications, such as a major runway extension; however, it is believed that some costs are understated.

A few instances are noted where modifications that may be required were not mentioned in the Wadell report. The most important difference is over the likelihood of reimbursement of capital costs via a FAA grant. It is unlikely that the volume of passengers associated with bad weather diversions would provide the 10,000 annual enplanements needed to qualify for a FAA grant. Introduction of twice-weekly service by Allegiant, even if seasonal, could allow BIH to reach the 10,000 passenger threshold. However, lacking any evidence of interest by Allegiant or a supporting air service study, the introduction of service by Allegiant is speculative.

### Routine Bad Weather Alternate Airport

This section assesses the circumstances for scheduled airlines to routinely use BIH as a bad weather alternative to MMH. This situation exists at SUN. During the winter, SkyWest Airlines (the regional operator for the Delta Air Lines and United Airlines service) assesses the likelihood of each scheduled flight being able to land at SUN two hours before the scheduled departure. If weather conditions make the landing unlikely, the flight is redirected to Twin Falls, Idaho. The airline arranges for buses to bring outbound passengers to Twin Falls. These buses then transport inbound passengers to Sun Valley. When flights are diverted after departure, the airline diverts to Twin Falls. However, under these circumstances only the inbound passengers receive bus transport.

It would be physically possible to establish a similar arrangement at BIH. It takes about 45 minutes to drive from MMH to BIH during good weather and dry road conditions. Although the trip would be longer during a snow storm, it would not be an unreasonably long trip. The first section concluded that it would be physically possible to modify BIH to meet Part 139 standards. Therefore, it can be concluded that it would be physically possible to establish BIH as a bad weather alternate to MMH.

However, this bad weather diversion practice works at SUN only because SkyWest operates scheduled service at Twin Falls. The airline can serve the diversions from SUN because Twin Falls already has the staff and facilities to serve the diverted flight. Mead & Hunt is unaware of an example of an airline routinely diverting to an airport where that airline did not offer scheduled service.

BIH does not currently have scheduled airline service. Given the population of Bishop and the surrounding region it appears unlikely that scheduled service would be established without subsidies or minimum revenue guarantees. Unless an airline has scheduled service to BIH it is unlikely that it would be willing to routinely use BIH as a bad weather alternative. This could only be overcome if an agency other than the airline funded the development of supporting facilities and staffing at BIH required to support the diversions.

## Implementation Costs

As part of this analysis, the magnitude of costs and a timeline for three scenarios was assessed:

1. Minimal level of Part 139 to divert and unload passengers
2. Part 139 plus TSA to divert and reload passengers
3. Part 139 for diversions and scheduled mainline aircraft

Order of magnitude cost estimates are provided in two tables that follow: **Table 7.2**, next page, documents the estimated capital costs and **Table 7.3**, on page 7.13, estimated staff-related costs. Additionally, **Table 7.4**, on page 7.13, lists the sources of operating costs and the frequency of these costs (e.g., annual). There are too many variables to provide estimates for these costs.

### Scenario 1: Limited Part 139

Historically a limited Part 139 category was available for airports that occasionally received charter flights. This category no longer exists. Part 139 does not have exemptions to its provisions for airports serving diversions, unless it is an unscheduled diversion for an emergency. Therefore, it is not an option to use BIH as a bad weather alternative to MMH simply to offload passengers.

### Scenario 2: Use for Diversions Only

For BIH to serve as a bad weather alternate for MMH, it would need to fully meet the Part 139 standards. This would require the airfield modifications, terminal expansion, support equipment (e.g., ARFF truck, snow plow), additional staffing and administrative support described in the preceding section. The only concession that Part 139 provides for airports with low flight frequency is the ability to use an ARFF vehicle one classification lower than would otherwise be required. At BIH this would mean having to comply with the standards for ARFF Index A rather than B. This means that a less expensive ARFF vehicle would be required.

It is assumed that BIH would use only a one-gate terminal as described in the Wadell report. It is expected that at peak use times more than one airline aircraft would be parked at BIH. This would result in the crowding and complications that currently occur at MMH. However, given the lower frequency of use, it is judged unlikely that BIH would choose to expand the terminal to meet peak demand.

### Scenario 3: Use for Diversions and Scheduled Mainline Aircraft

If the average number of daily departures remained below five, the facility, equipment and staffing requirements for BIH to serve both diversions and regularly scheduled airline service could be the same as for diversions only. If the average daily departures exceeded five, a larger ARFF truck or multiple trucks would be needed. Depending upon the volume of flights, a larger terminal might also be needed. If the level of service at BIH grew to the level of MMH, it would need the same three-gate passenger terminal that is currently proposed for MMH.

> *"Part 139 does not have exemptions to its provisions for airports serving diversions, unless it is an unscheduled diversion for an emergency."*

**TABLE 7.2 Estimated Capital Costs**

| Factor | Cost Elements | Order of Magnitude Cost | | Time to Complete |
|---|---|---|---|---|
| | | Minimum Part-139 | Service Similar to MMH | |
| **Airport Operating Manual (AOM)** | Preparation of AOM | $75,000 | $75,000 | 4 months |
| **Paved Surfaces** | None identified other than runway widening | $0 | $0 | 4 months |
| **Marking, Lighting and Signage** | Addition of taxiway edge stripes | $60,000 | $60,000 | |
| **Winter Operations** | Snow removal equipment | $1,500,000 | $1,500,000 | 12 months |
| **ARFF Service** | ARFF vehicle, heated storage structure | $120,000 | $200,000 | 1 year |
| **Deicing Equipment** | Assumes one truck | $50,000 | $50,000 | |
| **Ground Service Equipment** | E.g., baggage carts, belt loader, tugs, jet stair, ground power unit | $150,000 | $150,000 | |
| **Controlling Access** | Minimum assumes minor improvements in terminal area; maximum assumes new perimeter fence | $10,000 | $1,000,000 | 6 months to 2 years |
| **Wildlife Hazard Management Plan** | Includes Wildlife Hazard Assessment | $100,000 | $100,000 | 2 years |
| **Marking Construction Unserviceable Areas** | | $10,000 | $10,000 | 6 months |
| **Security Plan** | | $35,000 | $35,000 | 6 months |
| **Passenger Terminal** | Modular building for minimum; three-gate terminal for MMH equivalent | $1,500,000 | $30,000,000 | 4 years |
| **Widening of Runway 12-30** | Widen from 100 feet to 150 feet. Includes design, construction and construction administration | $6,000,000 | $6,000,000 | 4 years |
| **Replacement of ASOS with AWOS III** | AWOS III must include present weather | $350,000 | $350,000 | 1 year |
| **CEQA/NEPA Environmental Documentation** | Would include introduction of airline service and supporting improvements | $400,000 | $500,000 | 2 years |
| **Buses for transport to Mammoth Lakes** | Uncertain which entity would bear this cost | Unknown | Unknown | 4 months |
| **Total** | | **$10,360,000** | **$40,030,000** | |

*SOURCE: Mead & Hunt, Inc.*

**TABLE 7.3 Estimated Staff-Related Costs**

| Factor | Cost Elements | Order of Magnitude Cost | |
|---|---|---|---|
| | | Minimum Part-139 | Service Similar to MMH |
| **Record Keeping** | Full-time administrative position to maintain records | $40,000[1] | $40,000[1] |
| **ARFF/Airport operations staff** | For ARFF, airfield inspections and related | $65,000[2] | $225,000[3] |
| **Airport Manager** | Initially could be handled by existing County staff; year-round service would require a full-time manager | $0 | $80,000[4] |
| **Police Services** | Provide badged officers | On-call | Dedicated officers |

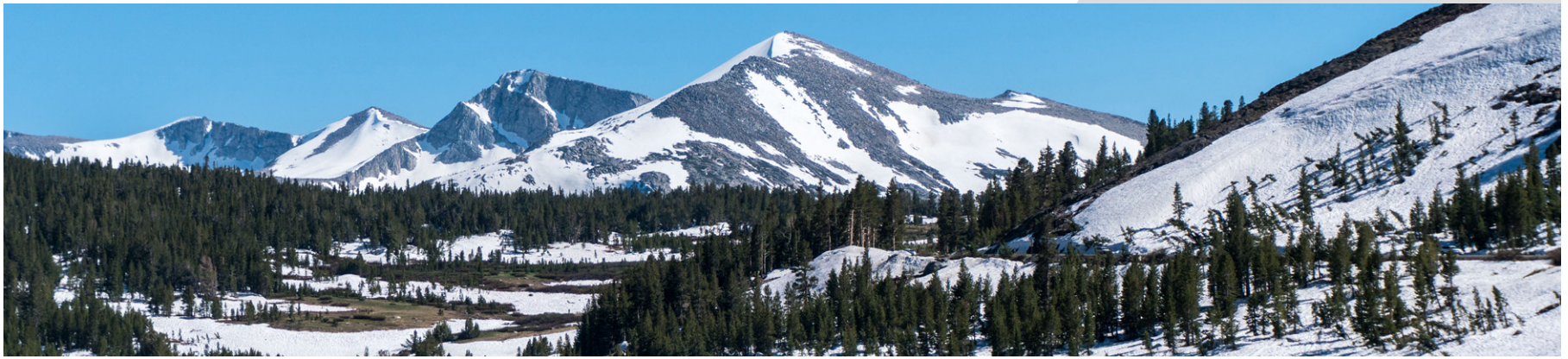
[1] Based upon City of Bishop Office Assistant, Step 1 with assumed 35 percent benefits cost rounded to nearest $5,000.
[2] Based upon 1.5 full-time equivalent City of Bishop Maintenance Worker with assumed 35 percent benefits cost rounded to nearest $5,000.
[3] Assumes a mixture of full-time and winter season staff equivalent to five full-time equivalents.
[4] Based upon City of Bishop Public Services Officer, Step 1 with assumed 35 percent benefits cost rounded to nearest $5,000.

**TABLE 7.4 Ongoing Operational Costs**

| Factor | Cost Elements | Frequency |
|---|---|---|
| **Utilities for terminal** | Additional utility costs for expanded terminal | Ongoing |
| **Ground transportation to Mammoth Lakes** | Drivers, fuel and maintenance | Could be winter season only or year-round |
| **ARFF vehicle** | Routine maintenance and fuel | Annually |
| **Ground service equipment** | Routine maintenance and fuel | Annually |
| **ARFF staff training** | Initial and currency training | Annually |
| **Airport staff security training** | One-time cost for all airport staff | Once when hired |
| **Deicing program** | Vehicle maintenance and deicing fluids | Annually |
| **Ground service equipment** | Equipment maintenance | Annually |
| **Insurance** | Associated with terminal, ARFF and other equipment and liability associated with commercial operations | Ongoing |
| **Commercial ramp monitoring** | Ramp requires 24/7 monitoring. Assume mixture of airport staff and security company remote monitoring via CCTV. | Ongoing |
| **Security badge system** | Direct costs of materials for badge system | Ongoing |
| **AWOS operation** | Weather dissemination service, tri-annual inspection, maintenance/repairs | Ongoing |
| **Terminal WI-FI** | Contract for services | Ongoing |
| **Flight information display** | Contract for services | Ongoing |

*SOURCE: Mead & Hunt, Inc.*

# 8 Next Steps



This section provides a review/discussion of the Eastern Sierra region's short (i.e., five-year) and long-term (i.e., 10-year) route opportunities as well as steps that can be taken to help mitigate MMH's reliability issues. The section concludes with action items for moving forward in the air service development process.

## Summary of Route Opportunities

*Section 5* identified numerous opportunities for Mammoth Lakes consideration. The opportunities were listed as either short-term or long-term. The short-term opportunities were identified as those that could likely operate from the current 7,000 foot runway with aircraft that are currently used at other ski destination airports. There may be additional physical changes required at MMH (e.g., strengthening of the runway to allow for mainline aircraft), but it is assumed that those changes could be made in the near-term and be less intensive than a full runway extension. Long-term opportunities included those that use aircraft that likely could not currently operate at the 7,000 foot runway length (i.e., need the 9,000 foot runway) or markets that need significant increased market demand to be sustained. Opportunities took into account the airline's current strategy at each of the hubs, available aircraft and the ability to operate the service at MMH. The top route opportunities as identified in *Section 5* are listed in **Table 8.1**.

**TABLE 8.1 Top New Route Opportunities**

| Short-Term | | Long-Term | |
|---|---|---|---|
| **Airline** | **Destination** | **Airline** | **Destination** |
| **United Airlines** | Chicago-O'Hare | **Alaska Airlines** | Portland |
| **United Airlines** | Denver | **Alaska Airlines** | San Francisco Bay Area |
| **American Airlines** | Chicago-O'Hare | **Alaska Airlines** | Seattle |
| **American Airlines** | Dallas-Fort Worth | **United Airlines** | Houston (IAH) |
| **American Airlines** | Phoenix (PHX) | **Allegiant Air** | Las Vegas |
| **Delta Air Lines** | Atlanta | **Allegiant Air** | Phoenix-Mesa (AZA) |
| **Delta Air Lines** | Minneapolis | | |
| **Delta Air Lines** | Salt Lake City | | |
| **Delta Air Lines** | Seattle | | |

SOURCE: Mead & Hunt, Inc.

### Short-Term Opportunities

Short-term opportunities include:

- **American Airlines** to Chicago-O'Hare, Dallas-Fort Worth and Phoenix-Sky Harbor
- **Delta Air Lines** to Atlanta, Minneapolis, Salt Lake City and Seattle
- **United Airlines** to Chicago-O'Hare and Denver

Any new service will need to have a strong balance between local passengers (i.e., those flying between the Eastern Sierra region and the nonstop market) and connecting passengers (i.e., those passengers connecting beyond the hub to other cities). All of the destinations listed are hubs for their respective airlines, and Dallas-Fort Worth and Chicago-O'Hare are the second and third largest markets for ski destination passengers (refer to **Table 5.2** on page 5.3). These markets, while demonstrating a robust market to ski resorts in general, have almost no traffic today to MMH (0.5 passengers daily each way (PDEW) to/from Dallas and 1.0 PDEW to/from Chicago).

The economic risk of operating to Atlanta, Chicago-O'Hare or Dallas-Fort Worth is substantially higher than for the other markets due to the requirement to operate much larger and more expensive mainline aircraft. That risk is partially offset by the large hub size and strong ski demand. The benefits of the shorter stage lengths of hubs like Salt Lake City or Phoenix are partially offset by both markets having minimal local demand today to the Eastern Sierra region and significantly smaller connecting opportunities as compared to Atlanta, Chicago or Dallas. Due to the need to make some fairly significant updates to MMH's airport capabilities as identified in *Section 3* in order to handle mainline aircraft, the most likely short-term opportunities are those that can handle CRJ-700 aircraft such as Denver, Phoenix, Salt Lake City or Seattle.

### Long-Term Opportunities

Long-term opportunities include:

- **Alaska Airlines** to Portland, the San Francisco Bay Area and Seattle
- **United Airlines** to Houston-Intercontinental
- **Allegiant Air** to Las Vegas and Phoenix-Mesa

While the identified markets for Alaska have relatively short stage lengths to MMH, they are either markets with minimal ski destination service (i.e., Portland), require aircraft that likely cannot operate today at MMH at the stage length (i.e., Seattle) or already have service from MMH from another airline (i.e., United Airlines to San Francisco). United service to Houston-Intercontinental would connect to a top five ski market and a hub that is one of United's largest; however, today there are only 0.6 PDEW going to the Eastern Sierra region. Allegiant's service could, in theory, operate today from MMH with Airbus A319 aircraft; however, Allegiant has not shown much inclination to operate to ski destinations except for MTJ.

The largest market outside of California for the first quarter of 2017 for MMH was Seattle at 3.0 PDEW. There is minimal connectivity at Seattle due to their Pacific Northwest location making most connecting destinations too circuitous to realistically connect. This means that Seattle would need to have a massive growth in local demand to the Mammoth Lakes area, of at least 1,000 percent, in order to approach a 50 percent load factor on the flights. Marketing and sales efforts will be critical to create that new demand.

## New Service Incentives

Consistent with existing service by Alaska Airlines and United Airlines, any new service will require a minimum revenue guarantee to offset the airline's risk. It would also incur significant marketing expenses in the origin market to make potential visitors aware of the service. MMH service today is only to California, and past service outside of the state performed poorly, with service to Las Vegas at a 24 percent load factor and service to Denver averaging a 26 percent load factor.

One likely factor to this performance outside of California is due to the relatively unknown reputation of the Mammoth Lakes area. Today, the vast majority of visitors to the area are from California. **Significant marketing and sales efforts would need to be undertaken for any new route outside of California, in order to bring more awareness of the Mammoth Lakes area.** No matter what route opportunity is pursued, very significant marketing efforts will need to be made to promote the area and skiing in the Eastern Sierra, which has not typically drawn significant visitors from areas outside of California.

## MMH Reliability Improvement

The physical proximity of MMH to the skiing in the Eastern Sierra is a primary reason MMH has scheduled commercial air service; however, it creates significant challenges for airline operations. As shown in **Table 4.10**, **Table 4.11** and **Table 4.12**, the completion percentage varies wildly from 90 percent in the 2012/2013 ski season to a low of 70 percent in the 2016/2017 ski season. The service for United is significantly less reliable than all the other peer ski destinations except SUN.

Improving operations at a mountain airport can be challenging; however, there are several projects that could be undertaken in the short- and long-term that could help to improve MMH reliability.

### RNP Instrument Approaches

As discussed in *Section 3*, Alaska Airlines has a new RNP instrument approach that lowered the ceiling minimum from 1,283 feet for both runways to 250 feet for Runway 27 and 265 feet for Runway 9. This instrument approach is currently only available to Alaska. Other carriers must use the original instrument approach with the 1,283 foot ceiling. Because of this, Alaska's flights can land at MMH when the ceiling is more than 1,000 feet lower than United aircraft can land at.

One option is for MMH or the community to pay to have public versions of the RNP instrument approaches that Alaska has created. An issue with this option is that Alaska's aircraft have the advanced equipment and pilot training needed to use the RNP procedures. Other airlines and older aircraft are less likely to be able to use RNP approaches. So merely having a publicly available RNP approach may have little benefit in the short term.

## Approach Lighting System

An approach lighting system will usually allow the instrument approach minimums to be lowered. Potentially this would allow the minimums to be lowered for the existing instrument approach to Runway 27. This would benefit airlines that do not have RNP approach capability; however, additional property at MMH would be needed for the approach lighting system. The basic system is approximately 1,600 feet long. To be eligible for FAA grants, the approach lighting system would need to be added to the ALP. Being a Part 139 airport makes it more likely that an approach lighting system would be funded by the FAA. Timing, however, is uncertain.

> ***"Improving operations at a mountain airport can be challenging; however, there are several projects that could improve MMH reliability."***

## Cat II or Cat III ILS

While this is old technology that essentially all airline aircraft can use, it would likely lower minimums; however, not all air carriers will be able to make Cat III approaches due to equipment/staff limitations. Whether it would lower minimums as much as the RNP approach is unknown. ILS approaches typically have wider clearance areas than RNPs but the mountains nearby may require higher minimums than the RNP approaches.

The expense to add a Cat II/III ILS could be considerable. The new equipment would include localizer and glide slope antennas, in-pavement touchdown zone lighting and probably additional visibility measuring equipment. To obtain useful improvements in the approach minimums, all of the hangars along the parallel taxiway may have to be removed. The FAA's policy is to move towards GPS-based systems, so this would be a hard sell.

## Extend Runway

Although a longer runway would not directly improve reliability, it would expand the types of aircraft that could use MMH. If coupled with a public RNP approach, it could increase the airlines that could use the RNP approach and reduce cancellations. The cost of extending the runway would be high and the potential need to shift the parallel taxiway would greatly increase cost.

## Alternate Diversionary Airport

The ability to use BIH as an alternate airport during inclement weather could also be an option to improve reliability. One example is SUN that works with their airlines to determine, prior to departure, the ability to complete the flight and pre-plan diversions to Twin Falls. Buses are contracted to move passengers between the airports. This works for SUN because the operating airline, SkyWest Airlines, operates at both airports.

There will be significant challenges that would need to be overcome for the airlines to use BIH, an airport with no scheduled commercial air service, as a diversionary airport. The BIH operation would essentially have to completely duplicate what is found at MMH and likely keep staff employed in case of diversion from MMH during the winter season. The logistics of moving MMH station personnel between airports to handle diversions is extremely complicated, especially if the diversion occurs with relatively little notice. The TSA has also been a challenge for many airports to acquire when they do not have service and would be even more of a challenge with no scheduled service. It is unlikely the TSA would staff BIH with screeners for MMH diversions only.

Significantly more analysis and discussions with the airlines to understand their needs and costs associated with having a diversion airport at BIH would need to be undertaken. *Section 7* identified that it would cost more than $10 million to obtain minimum Part 139 certification to handle diversions from MMH plus an unknown level of annual expenses to support diversions at BIH.

While MMH will need to have its runway strengthened to allow for mainline aircraft to operate, BIH's runway is rated to handle the weight; however, the current design standards require an Airbus A319 sized aircraft to have a 150 foot wide runway. BIH's runway is only 100 feet wide. It is likely that significant runway work would be needed at either BIH or MMH to handle larger, mainline sized aircraft.

## Next Steps

The following steps are recommended for the Eastern Sierra region's air service development process.

### Prioritize Target Routes

The first air service development step for Mammoth Lakes Tourism is to identify the top short-term opportunities from the community's perspective. While this report identified top opportunities from the airline strategy and available equipment standpoint, further consideration should be given based on the community's desires. It is recommended to take the short-term opportunity markets listed in **Table 8.1** and overlay community, marketing and funding priorities on that list to refine the highest priority market targets for the near term.

### Establish Incentive Plan

As previously mentioned, existing incentive plans are in place for the current Alaska and United scheduled commercial air service. It is recommended, prior to pursuing additional air service, that a standard incentive plan be established. This would provide an equitable basis between the airlines, ensuring that new plans are consistent with plans provided to other carriers. While this is of less importance with the funding coming from non-airport sources, it will help to mitigate any concerns existing carriers will have. It will also provide compliance with FAA grant assurances for any fee waivers provided by MMH.

This step also includes the development of a detailed marketing and sales plan to boost awareness in the nonstop markets of Mammoth Lakes as a destination. Marketing efforts will be critical in the Eastern Sierra region supporting additional air service.

### Meet with Air Carriers

Once target routes have been identified and an airline incentive plan is in place, it is recommended that Mammoth Lakes Tourism meet with target air carriers on a regular basis. Airline meetings occur through airline headquarters meetings and industry conferences. Airline headquarters meetings, recommended annually, typically provide the opportunity to meet with several airline planners over a one-hour period. However, headquarters meetings can be difficult to obtain depending on the airline's interest and availability. Some airlines will only meet every other year.

Air service conferences are designed as "speed dating" between the airlines and airports, and they allow for numerous meetings in the quickest and most efficient way possible. Many times, new air service can be tied back to initial conversations starting at one of these annual conferences. Conferences include ACI-NA's JumpStart conference, World Routes, Routes Americas and consultant-organized conferences such as Mead & Hunt's annual Air Service Development conference. These conferences provide the opportunity to meet with multiple carriers; however, meetings are short, typically only 20 minutes, and tend to be with just one or two airline representatives.

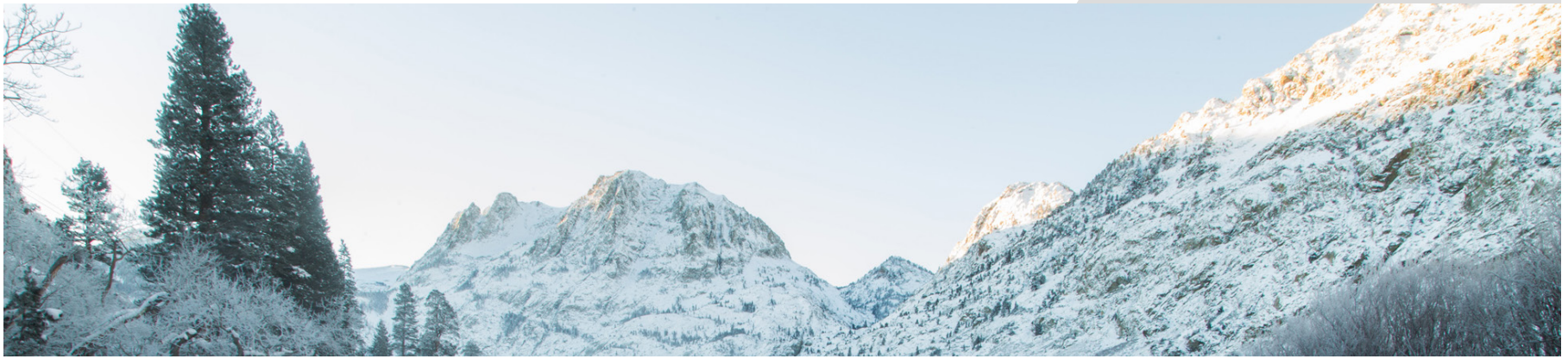
### Coordinate with MMH

As Mammoth Lakes Tourism works with the airlines to establish additional air service, coordination with the airport should also occur to help push forward projects that will enable the use of mainline aircraft and help improve reliability.

**Next steps in the Eastern Sierra region's air service development efforts for Mammoth Lakes Tourism includes:**

1. **Prioritize target routes**
2. **Establish incentive plan**
3. **Meet with air carriers**
4. **Coordinate with MMH**

# Appendix A: Glossary



*Appendix A* provides definitions for terms used throughout the Eastern Sierra Air Service Strategic Plan. Airport and airline codes used within the document and industry acronyms/ abbreviations are identified.

**The following is defined in this section:**

- Airport/airline industry terms specific to the industry
- Airport and airline codes
- Commonly-used industry acronyms and abbreviations
- Other newly-introduced terms used throughout the report

## Aircraft Operation

Refers to a landing or take-off of aircraft.

## Airport Certification Manual (ACM)

A manual that details compliance with regulations for Part 139 airports.

## Airline Codes

| | |
|---|---|
| AS | Alaska Airlines |
| UA | United Airlines |

## Airport Codes

| | |
|---|---|
| ASE | Aspen, CO |
| AZA | Phoenix-Mesa, AZ |
| BIH | Bishop, CA |
| DCA | Washington-National, DC |
| DFW | Dallas-Ft. Worth, TX |
| EGE | Vail, CO |
| GUC | Gunnison, CO |
| HDN | Steamboat Springs, CO |
| HOU | Houston-Hobby, TX |
| IAD | Washington-Dulles, DC |
| IAH | Houston-Intercontinental, TX |
| JAC | Jackson Hole, WY |
| JFK | New York-Kennedy, NY |
| LAX | Los Angeles, CA |
| LGA | New York-LaGuardia, NY |
| MCO | Orlando-International, FL |
| MMH | Mammoth Lakes, CA |
| MTJ | Montrose, CO |
| ORD | Chicago-O'Hare, IL |
| PHX | Phoenix-Sky Harbor, AZ |
| SAN | San Diego, CA |
| SEA | Seattle-Tacoma, WA |

## Airport Codes (Continued)

| | |
|---|---|
| SFB | Orlando-Sanford, FL |
| SFO | San Francisco, CA |
| SUN | Sun Valley, ID |

## Airport Operating Certificate (AOC)

Refers to the certificate of approval granted from a national aviation authority to an aircraft operator allowing the operator to use aircraft for commercial purposes.

## Airport Layout Plan (ALP)

A plan for the layout of an airport, showing existing and proposed airport facilities.

## ARFF

Acronym for Aircraft Rescue and Firefighting, a special category of firefighting that involves the response, hazard mitigation, evacuation and possible rescue of passengers and crew of an aircraft involved in (typically) an airport ground emergency.

## ASOS

Acronym for Automated Surface Observation System, designed to support weather forecast activities and aviation operations.

## Average Airfare (Fare)

The average of the airfares reported by the airlines to the US DOT. The average airfare does not include taxes or passenger facility charges and represents one-half of a roundtrip ticket.

## AWOS

Acronym for Automated Weather Observing System, a computerized system that automatically measures one or more weather parameters, analyzes the data, prepares a weather observation that consists of the parameter(s) measured, provides dissemination of the observations and broadcasts the observation to the pilot in the vicinity of the airport.

## Community Noise Equivalent Level (CNEL)

A noise measurement system for community noise exposure, with particular emphasis on airport noise. Calculated as a weighted average noise level over time.

## CRJ

Acronym for Canadair Regional Jet, a family of regional airliners manufactured by Bombardier.

## Destination Airport

Any airport where the air traveler spends four hours or more. This is the Federal Aviation Administration definition.

## Diversion Airport

A preselected place to land in the event an airline has a problem during a flight. A diversion airport must have appropriate facilities to handle the aircraft and meet minimum weather criteria.

## Enplanement

A passenger boarding a commercial aircraft.

## Essential Air Service (EAS)

Government subsidized airline service to rural areas of the US for communities that had air service prior to the Airline Deregulation Act of 1978, but subsequently lost air service.

## FAA

Acronym for the Federal Aviation Administration, a national authority with powers to regulate all aspects of civil aviation.

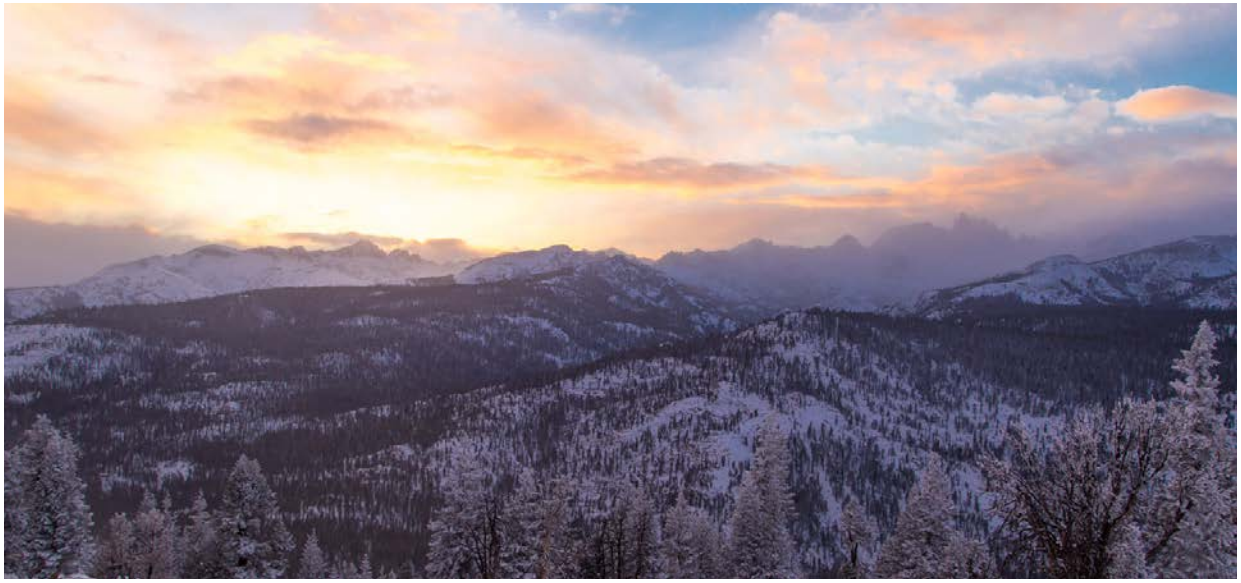
## Global Positioning System (GPS)

A global system of US navigational satellites developed to provide precise positional and velocity data and global time synchronization for air, sea and land travel.

## Hub

An airport used by an airline as a transfer point to get passengers to their intended destination. It is part of a hub and spoke model, where travelers moving between airports not served by direct flights change planes en route to their destination.

Hub also refers to an airport classification system used by the FAA (e.g., non-hub, small hub, medium hub and large hub). Hubs are classified as a percentage of total annual passenger boardings within the US: large hub (1 percent or more), medium hub (at least 0.25 percent but less than 1 percent), small hub (at least 0.05 percent but less than 0.25 percent) and non-hub (more than 10,000 but less than 0.05 percent).



## IPaC

Acronym for Information, Planning, and Consultation System, a project planning tool that streamlines the US Fish and Wildlife Services environmental review process.

## Initiated (Outbound) Passengers

Origin and destination passengers who began their trip from the local airport.

## Instrument Landing System (ILS)

A precision runway approach aid based on two radio beams which together provide pilots with both vertical and horizontal guidance during an approach to land.

## Itinerary Miles

Average total flight miles.

## Legacy Airline/Carrier

The category assigned to large hub and spoke airlines with nationwide route networks. Typical characteristics include offering first class and business class seating, a frequent-flyer program, exclusive airport lounges, meal service and in-flight entertainment. Many legacy carriers are also members of an airline alliance.

## Load Factor

The percentage of airplane capacity that is used by passengers.

## Local Market

The number of air travelers who travel between two points via nonstop air service.

## Low-Cost Carrier (LCC)

A category of airlines that has emerged since deregulation which offer low fares, minimal amenities and serve primarily high volume markets.

## Maximum Take-Off Weight

Maximum weight at which the pilot is allowed to attempt to take off, due to structural or other limits.

## Minimum Revenue Guarantee (MRG)

Type of incentive used to bring new air service into a community. The airline is guaranteed it will generate a specified amount of revenue from ticket sales associated with the new service. If the airline does not meet the target revenue, the local entity providing the guarantee makes a cash payment to the airline for the shortfall.

## Narrow-Body Jet

A jet aircraft with a single aisle designed for seating over 100 passengers.

## Navaid

Abbreviation for navigational aid, an electronic aid to navigation.

## Network Carrier

The category assigned to the large hub and spoke airlines with nationwide route networks.

## Nonstop Flight

Air travel between two points without stopping at an intermediate airport.

## Onboard Passengers

The number of passengers transported on one flight segment.

## Origin and Destination (O&D) Passengers

Includes all originating and destination passengers. In the context of this report, it describes the passengers arriving and departing an airport.

## Originating Airport

The airport used by an air traveler for the first enplanement of a commercial air flight.

## Passenger Facility Charge

Fee imposed by airports of $1 to $4.50 on enplaning passengers. The fees are used by airports to fund FAA approved airport improvement projects.

## Pax

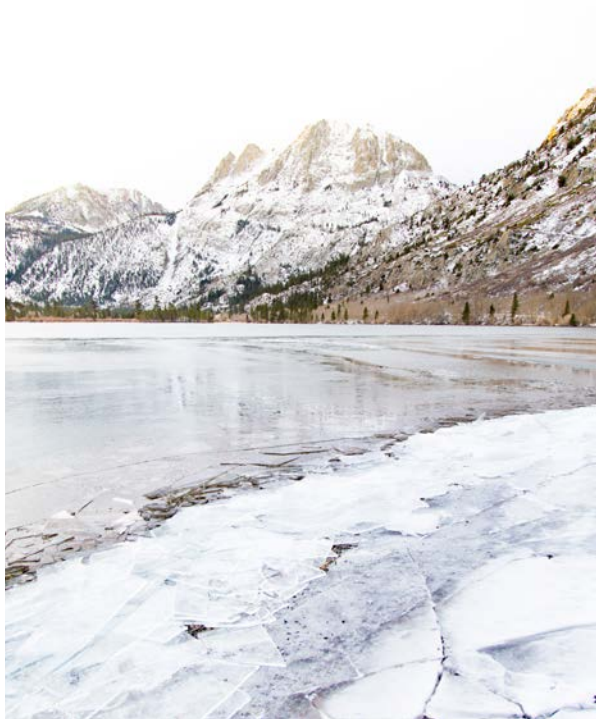
Abbreviation for passengers.

## PDEW

Acronym for passengers daily each way. This is a common way for airlines to measure origin and destination market demand.

## Point-to-Point

Nonstop service that does not stop at an airline's hub and whose primary purpose is to carry local traffic rather than connecting traffic.



## Rain Shadow Effect

An area having relatively little precipitation due to the effect of a topographic barrier, especially a mountain range, that causes the prevailing winds to lose their moisture on the windward side, causing the leeward side to be dry.

## RASM

Acronym for Revenue per Available Seat Mile, also referred to as unit revenue. Available seat-miles are aircraft miles flown on each flight multiplied by the seat capacity available for sale. Passenger revenue is the number of paying passengers flown multiplied by the fare they paid.

## Referred (Visiting) Passenger

Origin and destination passengers who began their trip from outside the local area.

## Regional Airline

Airlines that specialize in serving smaller markets with smaller aircraft normally in association with a larger airline.

## Regional Jet

A jet aircraft with a single aisle designed for seating fewer than 100 passengers.

## Required Navigation Performance (RNP)

A type of performance-based navigation that allows an aircraft to fly a specific path between two 3D-defined points in space. Area navigation (RNAV) and RNP systems are fundamentally similar. The key difference between them is the requirement for on-board performance monitoring and alerting.

## Scheduled Air Service

Flights provided between cities at pre-planned departure and arrival times.

## Stage Length

Distance of itinerary nonstop leg.

## Statute Miles

A unit of linear measure equal to 5,280 feet, or 1,760 yards. Statute mile is commonly used for Visual Flight Rules (VFR) visibility requirements in aviation.

## TSA

Acronym for Transportation Security Administration, an agency of the US Department of Homeland Security that has authority over the security of the traveling public in the US.

## Turboprop Aircraft

A type of engine that uses a jet engine to turn a propeller. Turboprops are often used on regional and business aircraft because of their relative efficiency at speeds slower than, and altitudes lower than, those of a typical jet.

## Ultra-Low-Cost Carrier (ULCC)

Differentiates some low-cost carriers whose model deviates further from that of a standard low-cost carrier, with ultra-low-cost carriers having minimal inclusions in the fare and a greater number of add-on fees.

## US DOT

Acronym for US Department of Transportation, a federal Cabinet department of the U.S. government concerned with transportation.

## Wide-Body Jet

A jet aircraft with two aisles designed for seating greater than 175 passengers.

## YE

Acronym for year ended, includes the related 12-month period.

## Yield

Yield is calculated by dividing total revenue by total itinerary miles.

## YOY

Acronym for year-over-year, a comparison of the results at one time period with those of a comparable time period on an annualized basis.