CHAPTER SIX: CURRENT AVIATION SYSTEM PERFORMANCE

INTRODUCTION

As previously discussed, the 2018 State Aviation System Plan (SASP) Update system goals and performance measures were enhanced and refined compared to the 2008 SASP. For the 2018 SASP Update, three goals were established to describe a statewide system of airports that fully meets the needs of citizens, visitors, and businesses. The goals established to evaluate the system are presented in order of priority as follows:

1. **Safety and security.** Arizona should maintain a safe and secure airport system as measured by compliance with applicable safety and security standards while supporting health and safety-related services and activities.
2. **Fiscal responsibility.** Arizona should implement cost-effective investment strategies to meet current and projected demand while remaining adequately accessible to Arizona's citizens, visitors, and businesses.
3. **Economic support.** Arizona should advance a system of airports that promote Arizona's economic growth and development.

Based on these goals, performance measures and system indicators were developed that provide the framework for measuring the system's ability to achieve existing and future demands, while assessing the overall health and adequacy of the aviation system. Performance measures quantitatively evaluate specific aspects of system performance that can be directly affected by project funding, policies, and other external inputs. System indicators are a new measurement tool in the 2018 SASP Update that generally serve as reporting mechanisms on aspects of system performance that cannot be affected by project funding, policies, and inputs. However, some indicators may influence a policy decision and/or be related to a performance measure that has an action associated with enhancing the system's performance. Performance measures and system indicators provide insight in three primary areas:

1. Areas of the state where the system can sufficiently serve existing and future needs
2. Specific airport or system deficiencies within the state
3. Areas of surplus or duplication of service within the system

Another way to guide system performance is to develop objectives for airport facilities and services, based on an airport's role. **Chapter 5: Airport Classifications Analysis** described the process and results of the role classification for each airport in the system. The objectives set for each classification: Commercial Service-International; Commercial Service-National; Reliever; General Aviation (GA)-Community; GA-Rural; and GA-Basic are detailed in **Appendix E.** A summary of objectives by airport role is provided at the end of this chapter.

The following three sections of this chapter present an analysis of the performance measures and performance indicators associated with each goal, with analysis based on each airport role classification. The primary source of data for the evaluation was the 2018 SASP Update inventory effort, with several other sources including the Federal Aviation Administration (FAA), Arizona Department of transportation (ADOT) Aeronautics Group, and other third-party sources also utilized. Each data source is noted by performance measure or system indicator. All results are presented by airport role and the system as a whole. Additional details about the data collection process for the 2018 SASP Update are provided in **Chapter 3: Identification of Airport Assets**.

GOAL CATEGORY: SAFETY AND SECURITY

One of the most common phrases associated with airport planning and design is "safety first." The safety of pilots and passengers in the sky, as well as individuals and property on the ground, must remain at the forefront of all policies, projects, procedures, and other components of aviation. Accordingly, safety and security are keystones of a properly functioning aviation system.

The FAA and the State of Arizona have established safety standards designed to mitigate risks to people and property associated with aviation. While a full assessment of an individual airport's full compliance with standards is generally a function of the master planning process, it is important for a statewide system plan to provide an overview of the system's ability to conform to appropriate standards.

Performance Measures

This section discusses results of the system-wide evaluation of the performance measures associated with the safety and security goal category. All of the analyses reported below utilize data from the 2018 SASP Update Airport Inventory and Data Survey Form. Performance measures evaluated include:

1. Percent of airports capable of supporting medical operations
2. Percent of airports with surrounding municipalities that have adopted controls/zoning, including "disclosure areas," to make land use in the airport environs compatible with airport operations and development
3. Percent of airports controlling all primary runway end Runway Protection Zones (RPZs)
4. Percent of airports that have Runway Safety Areas (RSAs) on their primary runway that meet the standards for their current airport reference code (ARC)
5. Percent of airports with clear approaches

Percent of Airports Capable of Supporting Medical Operations

Medical flights offer access to patients in need of specialized or emergency medical care, as well as transport of healthcare personnel to rural areas to provide care. These services are particularly important for residents of remote and/or Tribal communities without nearby access to medical facilities. Providing a network of airports to connect medical professionals with patients is one of the most important functions an aviation system can provide. Both rotorcraft and fixed-wing aircraft are used to support medical operations, and both offer a number of distinct advantages over ground ambulances in certain situations. During emergencies, medical personnel have a certain timeframe to transport patients to an appropriate facility to maximize their chances of survival and recovery. Rotorcraft typically serve patients in true emergency situations when immediate care is literally a matter of life or death. Rotorcraft offer flexibility because they can land almost anywhere, including helipads located at some trauma centers. However, rotorcraft have limited fuel capacity and can only travel a relatively short distance without refueling.

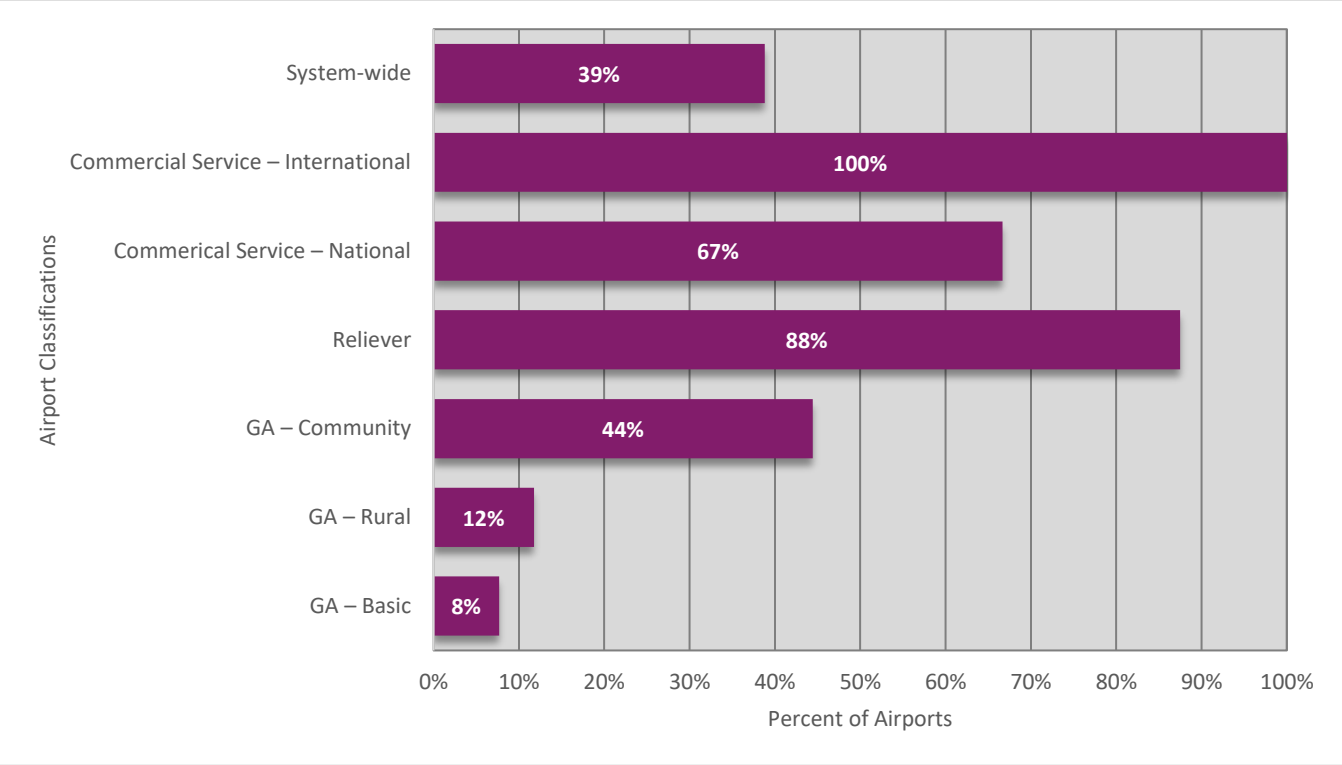
Because they need an adequate runway on which to operate, fixed-wing aircraft have far less flexibility than rotorcraft. However, they have a much longer range and can be less costly to operate. They can still offer life-supporting care for patients who are critically ill or injured. Accordingly, fixed-wing aircraft are generally used to transport patients between hospitals when injuries or illnesses occur beyond the range of most rotorcraft or

when medical conditions do not warrant the urgency that rotorcraft provide. Additionally, medical personnel traveling to remote locations to provide healthcare typically use fixed-wing aircraft as long as an adequate runway is available.

Based on industry standards and discussions with medical operators in Arizona, an airport was considered capable of supporting medical operations for fixed-wing aircraft if it met the following four criteria:

1. Primary runway length ≥ 4,000 feet
2. Fuel service provided 24 hours/7 days a week (24/7)
3. Non-precision instrument (NPI) approach capability
4. Weather reporting[1]

Figure 1 presents the percentage of SASP airports that meet the identified criteria for supporting medical operations.



Source: Airport Inventory and Data Survey 2017

Figure 1. Percent of Airports that Meet Criteria to Support Medical Operations

System-wide, 39 percent of airports were identified as having the four characteristics that generally indicate adequate support for medical operations by fixed-wing aircraft. One hundred percent of Commercial Service-International and 67 percent of Commercial Service-National achieve the four criteria.

[1] 4,000 feet of runway length was used as the baseline; however, airports at higher elevations will require a longer runway length.

Amongst the GA classifications, 88 percent of Reliever airports, 44 percent of GA-Community, 12 percent of GA-Rural, and 8 percent of GA-Basic have the facilities to support medical operations.

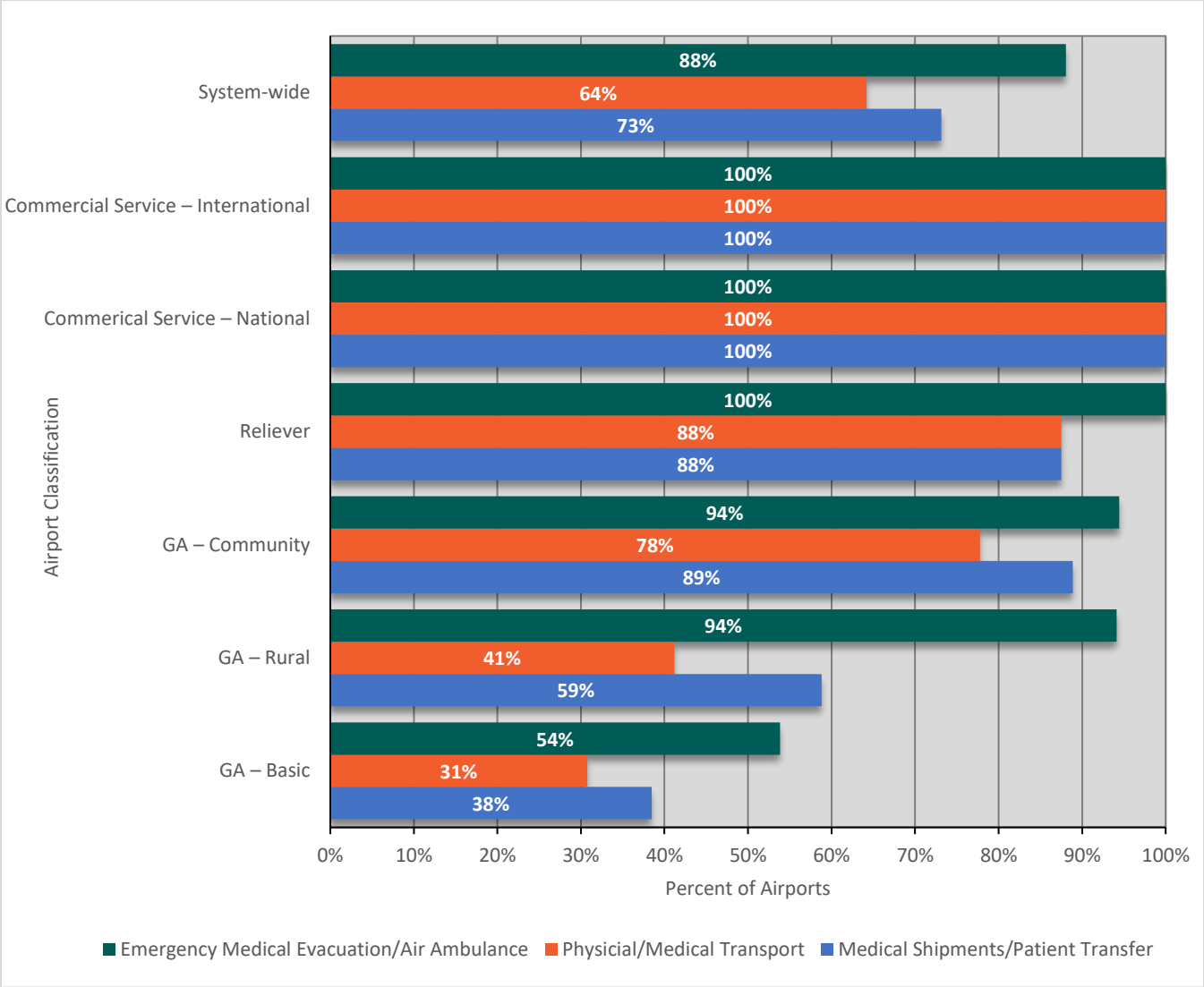
The four criteria outlined above describe those airports which can optimally support fixed-wing medical flights. Yet airports across the state regularly accommodate medical operations with more limited facilities and services. Rotorcraft, which are generally used for short, time-sensitive patient transport, do not need a 4,000-foot runway, but would benefit from 24/7 fuel, at least a NPI approach procedure, and weather reporting capabilities. Additionally, many airports can accommodate fixed-wing aircraft during visual flight rules (VFRs), thereby requiring neither an instrument approach procedure (IAP) nor weather reporting when conditions are favorable.

An example of accommodating medical operations with limited facilities and services can be seen at an airport in eastern Arizona with a 3,400-foot runway, reporting that it at least occasionally supports various types of medical flights. Despite its relatively short runway length, the airport is the only facility in the region that provides an IAP and weather reporting. These services become critical during the winter weather conditions characteristic of that area of the state. Thus, while the airport does not meet the four criteria to optimally support medical operations, it literally plays a lifesaving role for residents and visitors to the region.

To capture the full extent of medical operations occurring in Arizona, airport managers/sponsors were asked if their airport accommodates any of the following types of activities by either fixed-wing aircraft or rotorcraft:

1. Emergency medical evacuation/air ambulance
2. Physician/medical transport
3. Medical shipments/patient transfer

Figure 2 presents the results of SASP airports by role that replied they accommodate any level of medical operations, regardless of runway length, approaches, or facilities. In total, 88 percent of SASP airports indicated they accommodate emergency medical evacuation/air ambulance, 64 percent accommodate physician/medical transport, and 73 percent accommodate medical shipments/patient transfer.



Source: Airport Inventory and Data Survey 2017

Figure 2. Percent of Airports Accommodating Medical Operations

Percent of Airports with Surrounding Municipalities that have Adopted Controls/Zoning, Including "Disclosure Areas," to Make Land Use in the Airport Environs Compatible with Airport Operation and Development

Protecting the land use and airspace around an airport is critical to an airport's long-term viability. In general, the objective of airport compatible land use is to promote development that is considered compatible with airports and preclude incompatible uses such as residential areas, schools, hospitals, and churches near airports. While aircraft noise is one of the most recognized incompatibility concerns, issues such as future airport expansion potential, the safety of people and property (both in the sky and on the ground), and environmental impacts also influence the types of development and activities considered compatible with airport operation and development.

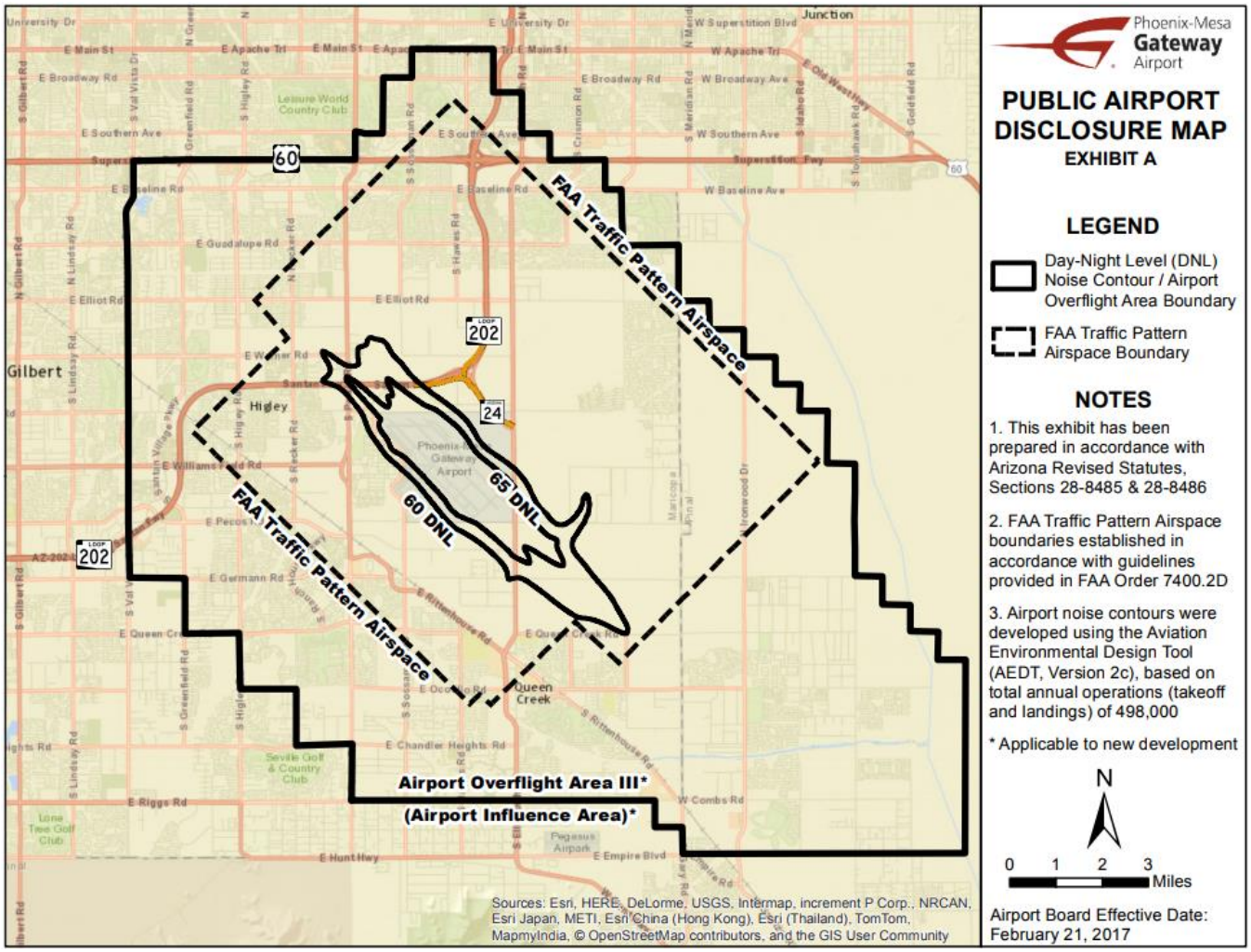
Although the FAA has developed standards and programs designed to promote airport land use compatibility, the primary responsibility for regulating development in the vicinity of an airport lies with local governments. Municipal governments are responsible for preparing comprehensive plans and reviewing and implementing zoning and land use policies that consider impacts to their local airport. Controls such as height and land use zoning aim to reduce incompatible land uses and activities in an airport's immediate environs.

In Arizona, political subdivisions of the state that operate a public airport are also responsible for complying with Arizona Revised Statute (A.R.S.) 28-8485.[2] This statute mandates that airports must identify the area surrounding its facility on an airport disclosure map to notify existing or potential property owners that the area is subject to aircraft noise and overflights. This area is defined as the property within the airport's traffic pattern airspace as defined by the FAA and experiences a day-night average sound level as follows:

1. In counties with a population of more than 500,000 persons, 60 decibels or higher at airports where such an average sound level has been identified in either the airport master plan for the 20-year planning period or in a noise study prepared in accordance with airport noise compatibility planning, 14 Code of Federal Regulations (CFR) Part 150.
2. In counties with a population of 500,000 persons or less, 65 decibels or higher at airports where such an average sound level has been identified in the airport master plan for the 20-year planning period.

Once identified, the airport is required to file the airport disclosure map with the Arizona Department of Real Estate. **Figure 3** shows an example of one such document, the public airport disclosure map for the Phoenix-Mesa Gateway Airport. **Chapter 2: Review of Current Policies** provides further details regarding airport disclosure maps and airport influence areas.

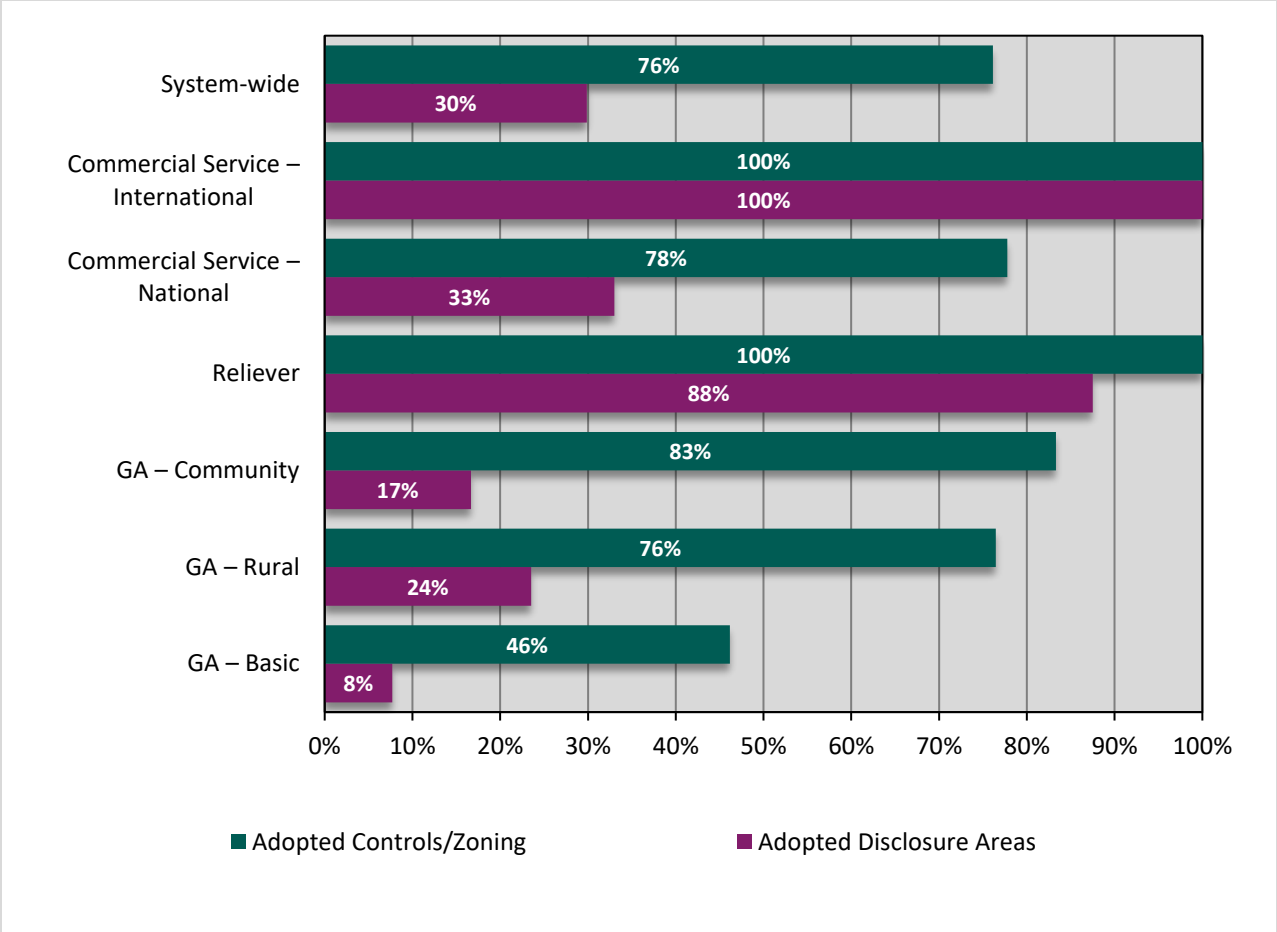
[2] Political subdivisions of the state that operate a public airport can also designate all property within the vicinity of an airport as an airport influence area after a notice and a hearing (A.R.S. 28-8485). The area must be exposed to aircraft noise and overflight with a day-night average sound level of 65 decibels or higher or be within such a geographic distance from an existing runway that it is exposed to aircraft noise and overflights. Once the area has been identified, the airport influence area must be recorded with the office of the county recorder in which the property is located. Airport disclosure maps are obligatory, while airport influence areas are established at the discretion of the airport owner.



Source: Arizona Department of Real Estate 2017

Figure 3. Example of a Public Airport Disclosure Map

In Arizona, airport compatible land use is a growing concern, especially as urban infill encroaches into previously undeveloped areas. **Figure 4** summarizes the percentage of airports by role that are within communities with airport-compatible controls or zoning, and those with an available public airport disclosure map as identified from the Airport Inventory and Data Survey. In total, 76 percent of system airports responded that they have established airport-compatible controls or zoning with their communities, while 30 percent noted they have established disclosure areas.



Source: Airport Inventory and Data Survey 2017

Figure 4. Percent of Airports by Classification with Compatible Controls/Zoning and Disclosure Areas

Percent of Airports Controlling all Primary Runway End Runway Protection Zones

The FAA has defined several key safety areas on and adjacent to runways. As shown in **Figure 5**, the RPZ is a trapezoid-shaped area off each end of the runway designed to protect people and property on the ground in the event of a runway overrun or undershoot. The dimensions of a runway end's RPZ are based on factors including the aircraft approach category (AAC) and airplane design group (ADG) of the most demanding aircraft utilizing the airport and visibility minimums to the runway. According to FAA Advisory Circular (AC) 150/5300-13 (change 1), the RPZ's ability to enhance safety "is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities" (FAA 2012, p. 71).

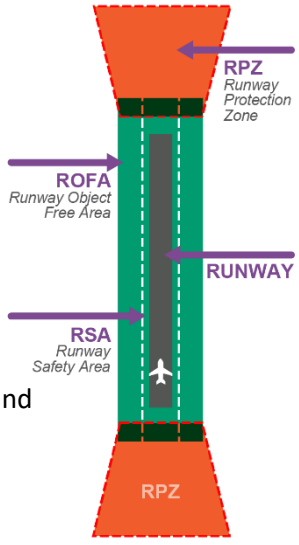
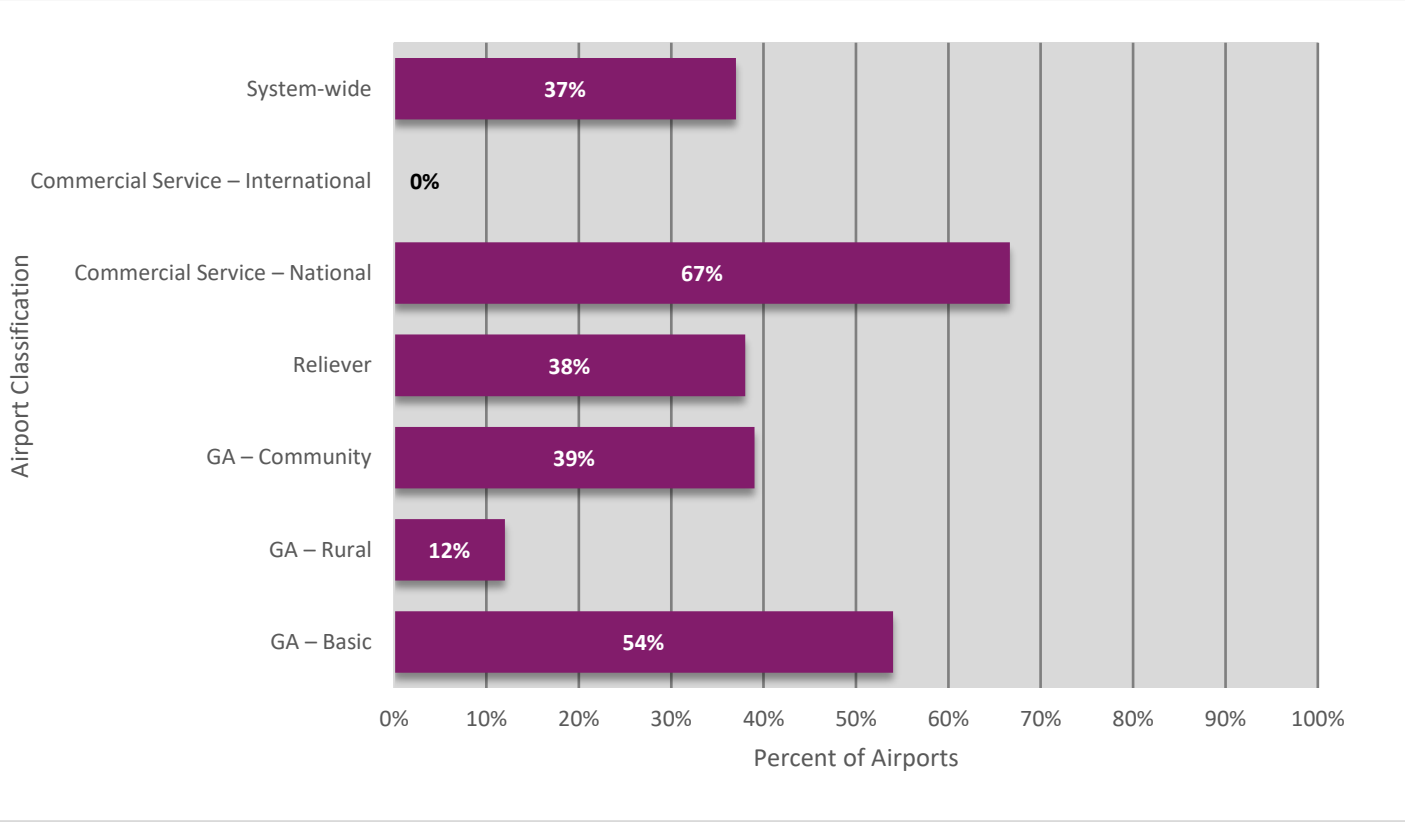


Figure 5. RPZ

Airport managers/sponsors were asked the percent of control they exercised over their runways' RPZs through either fee simple (ownership) or easement during the inventory process. **Figure 6** presents data according to the SASP airports' responses by classification regarding control (by ownership or easement) of the entire RPZ area for both ends of their primary runway. Of the 67 system airports, 37 percent reported complete control of their primary runway RPZs via fee simple, easement, or combination of both. Neither of the two Commercial Service-International airports have control over their entire primary runway RPZs.



Source: Airport Inventory and Data Survey 2017

Figure 6. Percent of Airports by Classification Controlling all Primary Runway End RPZs

Percent of Airports that have Runway Safety Areas on their Primary Runway that Meet the Standards for their Current Airport Reference Code

As shown in **Figure 5**, the Runway Safety Area (RSA) is a rectangular box surrounding a runway designed to enhance the safety of aircraft that undershoot, overrun, or veer off the runway and improve the runway accessibility for aircraft rescue and firefighting (ARFF) equipment during such incidents (FAA 2012, p. 59). The current RSA standards are based on 90 percent of overruns being contained within the RSA. RSAs are determined based on the runway design code (RDC) and the visibility minimums of the runway. For single-runway airports, the RDC is the same as the ARC, and the ARC is typically the same as the RDC for an airport's primary runway if it has multiple runways. The RSA is centered on the runway centerline and extends beyond the runway end thresholds, as described in **Table 1**.

Table 1. Runway Safety Area Dimensions

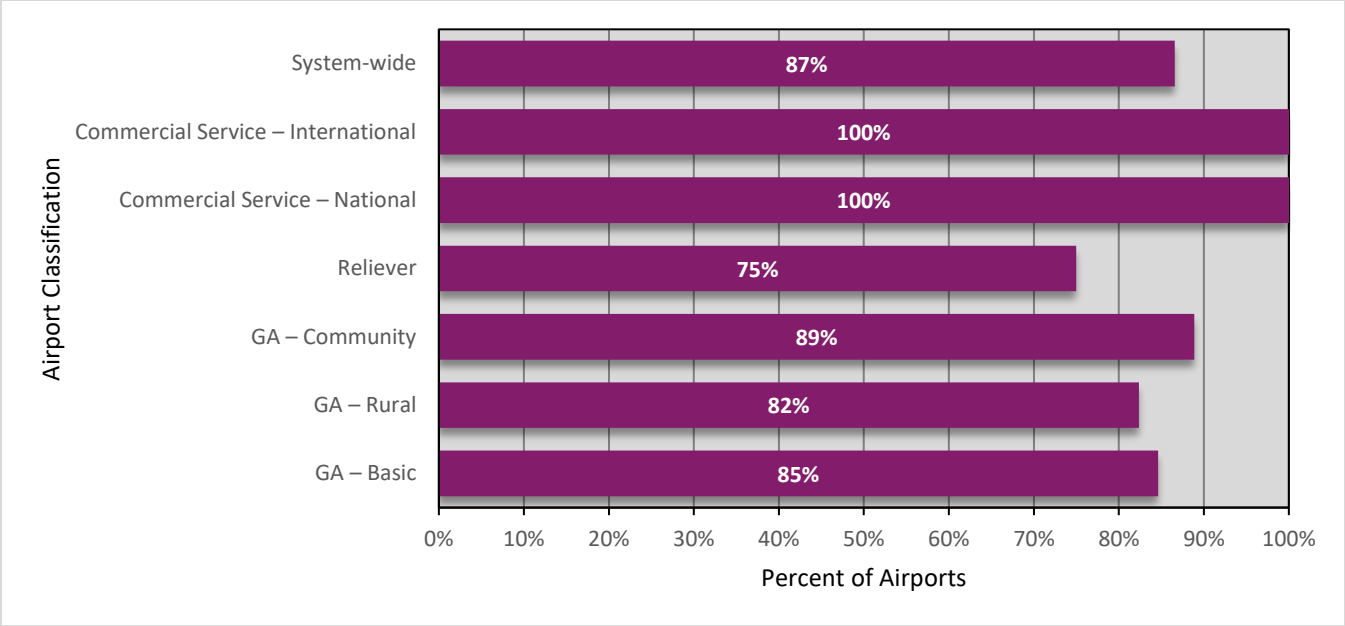
RDC/ARC	Runway Safety Area Dimensions	
	Visibility Not Lower Than 3/4 Mile	Visibility Lower Than 3/4 Mile
A/B-I	240' beyond runway end	600' beyond runway end
	240' prior to threshold	600' prior to threshold
	120' width	300' width
A/B-II	300' beyond runway end	600' beyond runway end
	300' prior to threshold	600' prior to threshold
	150' width	300' width
A/B-III	600' beyond runway end	800' beyond runway end
	600' prior to threshold	600' prior to threshold
	300' width	400' width
A/B-IV	1,000' beyond runway end	1,000' beyond runway end
	600' prior to threshold	600' prior to threshold
	500' width	500' width
C/D/E	1,000' beyond runway end	1,000' beyond runway end
	600' prior to threshold	600' prior to threshold
	500' width	500' width

Source: Federal Aviation Administration 2012

In general, the RSA is required to be cleared, drained, and graded in a way that removes all potentially hazardous topography, prevents water accumulation, is free of objects except those that need to be located in the RSA because of their functions (such as certain navigational aids [NAVAIDs]), and capable of supporting snow removal and ARFF equipment under dry conditions. Additional items that may result in a noncompliant RSA include insufficient property ownership of the RSA area and lack of surface vehicle access. An RSA that meets these standards and has the proper dimensions is considered compliant according to the FAA.

Airport managers/sponsors were asked if their primary runway achieved RSA standards provided in FAA AC 150/5300-13 (change 1) during the airport inventory process. **Figure 7** summarizes primary runway RSA compliance by airport classification as determined through the inventory interviews. In total, 87 percent of the Arizona system meets ARC standards for their primary RSA, including 100 percent of Commercial – International airports. No classification has fewer than 75 percent of airports compliant with this standard.

It should be noted that airports not included in the FAA's National Plan of Integrated Airport Systems (NPIAS) are not required to meet RSA standards; however, ADOT recommends the FAA's standards for safety for all airports regardless of inclusion in the NPIAS.



Source: Airport Inventory and Data Survey 2017

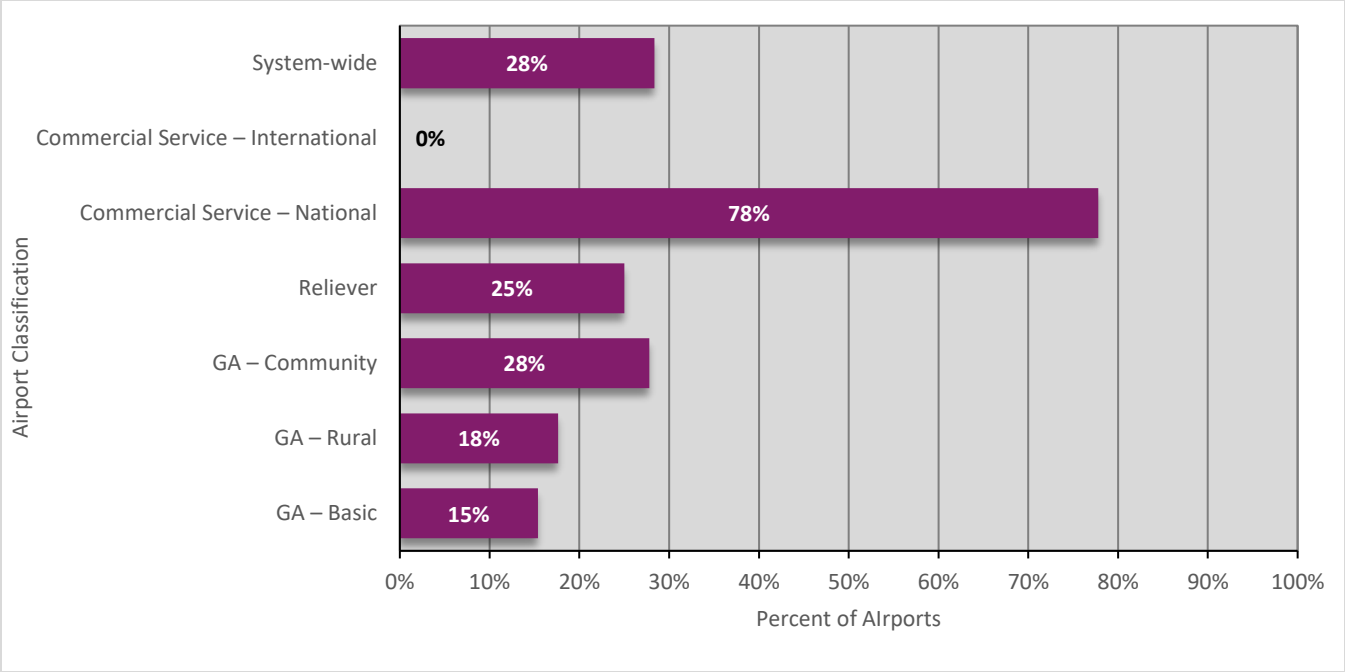
Figure 7. Percent of Airports by Classification Meeting Primary Runway RSA Standards

Percent of Airports with Clear Approaches to Both Ends of the Primary Runway

The FAA maintains records of approach slopes and obstructions in the FAA 5010 Master Record. These records provide optimal and actual glide slopes, as well details about any obstructions affecting an airport's imaginary surfaces. Obstructions can include human-made infrastructure, such as buildings, transmission lines, and cell phone towers, as well as natural features like hills, mountains, and vegetation. Airports should maintain clear approaches to all runway ends to the greatest extent feasible to optimize aircraft safety, especially during less-than-ideal weather conditions. Accordingly, many airports implement obstruction removal programs to combat, prevent, or alleviate the negative effects of obstructions, which often include (but are not limited to) a vegetation management plan.[3]

Airports' 5010 Master Records were utilized to determine the percent of airports with clear approaches to both primary runway ends. Airports were also asked if they have an adopted obstruction removal program as part of the airport inventory. As presented in **Figure 8**, only 28 percent of the system has clear approaches. Twenty-two percent of the system indicated adoption of obstruction removal programs via the Airport Inventory and Data Survey.

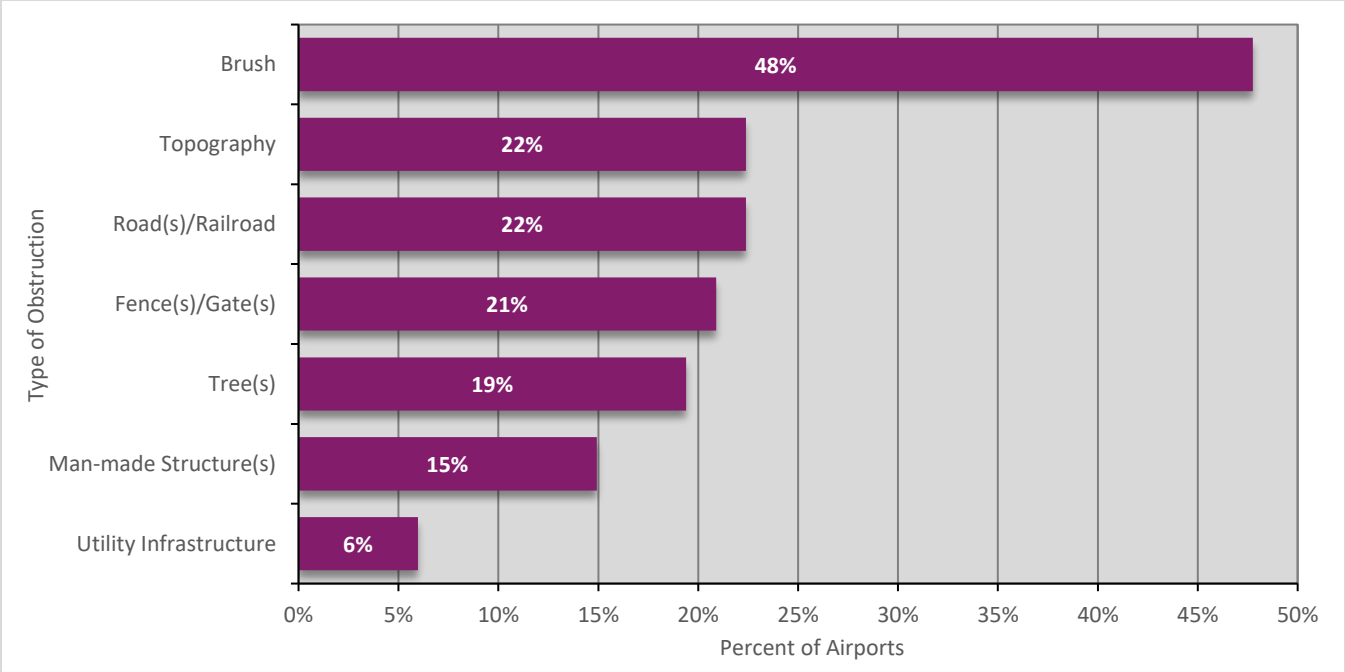
[3] Airports with vegetation management plans are a system indicator and are accordingly discussed in more detail on page 15 of this chapter.



Sources: FAA 5010 2017, Airport Inventory and Data Survey 2017

Figure 8. Percent of Airports by Classification with Clear Approaches to Both Ends of the Primary Runway

It is important to understand the type of obstructions most commonly found at Arizona's system airports to help identify the most appropriate solution to mitigate this concern. Brush and trees, for example, can be addressed by developing an adequate vegetation management plan, while certain man-made obstacles such as roads, buildings, and utility lines are often beyond an airport's jurisdiction and thus difficult to remove. Based on a review of airports' current FAA 5010 Master Records, brush is the most prevalent obstruction across the state, with approximately half of airports reporting an issue. Approximately one-fifth of all airports have issues with topographic features (such as hills and mountains), fences and gates, and roads and railroads. Other man-made structures, including buildings, are not reported as a major issue of concern, although can pose a serious safety risk in those instances where present. **Figure 9** summarizes obstructions found at Arizona's system airports.



Source: FAA 5010 Master Record 2017

Figure 9. Percent of Airports with Obstructions by Type

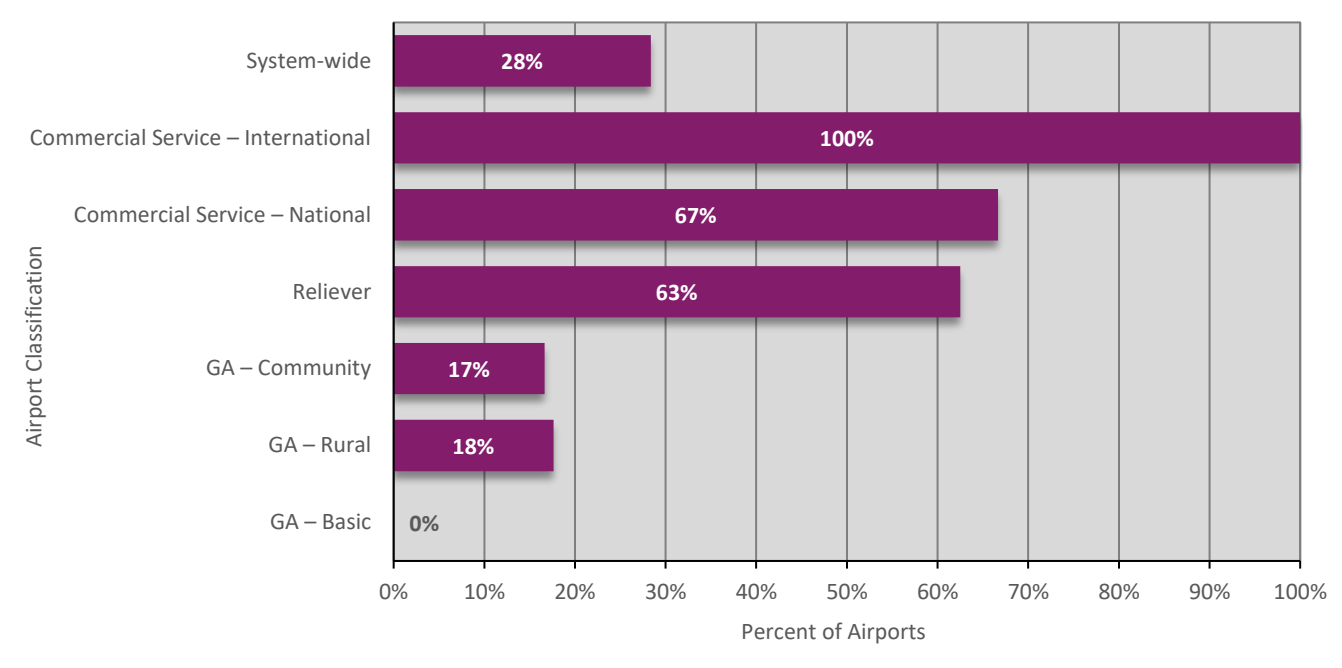
Percent of Airports with Adopted Wildlife Plans in Accordance with Appropriate FAA Regulations

Wildlife can present serious safety risks to airport operations, potentially endangering aircraft and their occupants, as well as the wildlife. While birds comprise 97 percent of all reported aircraft strikes nationwide, mammals and reptiles can also pose significant threats. Due to the rural nature of many of Arizona's airports, wildlife hazards are a frequent concern. In northern and eastern Arizona, large mammals including elk and deer can be extremely dangerous if present on an airfield. Cows in aircraft movement areas have also been reported across the state.

While airport fencing is the primary means of preventing wildlife from entering the airfield, not all wildlife can be kept out by fencing, nor does every system airport have full perimeter wildlife fencing.[4] Because animals are attracted to areas that reflect their natural habitats and provide food and water, airports can control land use and landscaping to minimize potential attractants. Airports can perform wildlife hazard site visits to understand what threats exist for their property or develop wildlife hazard assessments (WHAs) and wildlife hazard management plans (WHMPs) to develop a strategy for mitigating these threats. The FAA requires WHAs at FAA Part 139-certified airports. Airports may also be required to develop a WHMP. While such plans are only required for Part 139 airports, they are strongly encouraged for all airports.

[4] Detailed information on airport fencing can be found in Appendix E – Facility and Service Objectives.

Airports were asked if they have conducted WHAs or WHMPs in accordance with appropriate FAA regulations during the airport inventory. As shown in **Figure 10**, only 28 percent of Arizona's system airports have an adopted WHA or WHMP. This includes 100 percent of Commercial-International airports, 67 percent of Commercial-National airports, and 63 percent of Reliever airports.



Source: Airport Inventory and Data Survey 2017

Figure 10. Percent of Airports by Classification with an Adopted WHA or WHMP

System Indicators

This section discusses results of the evaluation of system indicators associated with the safety and security goal category. As previously mentioned, system indicators measure progress but may not be directly impacted by ADOT or airport actions. System indicators include:

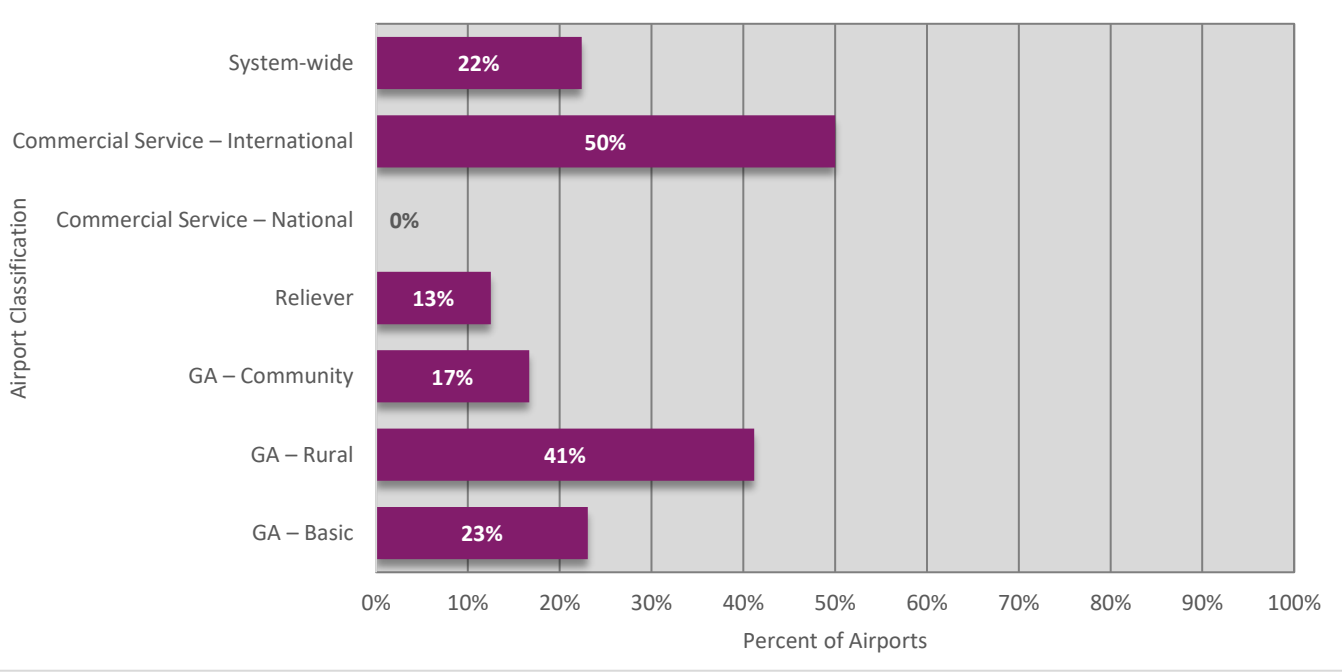
1. Percent of airports that have active vegetation management plans to clear obstructions from their approaches
2. Percent of airports that have a written emergency response plan
3. Percent of airports that support aerial firefighting operations

Percent of Airports that have Active Vegetation Management Plans to Clear Obstructions from their Approaches

Airports can enhance the safety of aircraft operations by creating programs or plans designed to remove or minimize the threat of vegetation or other obstructions within the runway approach. Airspace is defined and delineated by a set of geometric spaces known as imaginary surfaces which extend outward and upward from airport runways. The FAA has developed standards for the maximum acceptable height of objects beneath and within these imaginary surfaces (including the runway approach). While some types of obstructions are difficult or impossible to remove (such as man-made or terrain obstructions), vegetation can typically be controlled by

establishing and implementing ongoing monitoring and removal procedures. The FAA also notes that such a proactive approach to vegetation management not only mitigates the risk of potential obstruction hazards, but also allows the FAA to optimize the instrument approach minimum altitudes without compromising the minimum required obstacle clearance (FAA 2013). A formal vegetation management plan is often one characteristic of airports with clear approaches.

Airports were asked if they had adopted a formal vegetation management during the airport inventory. It was identified that 22 percent of SASP airports maintain a vegetation management plan. As presented in **Figure 11**, only one of the 11 commercial service airports and one of the eight Reliever airports maintain a vegetation management plan. While many of the SASP airports reported that they do not have a formal vegetation management plan, other airport representatives reported that their airports clear vegetation from runway ends on an as-needed basis.



Source: Airport Inventory and Data Survey 2017

Figure 11. Percent of Airports by Classification with a Formal Vegetation Management Plan

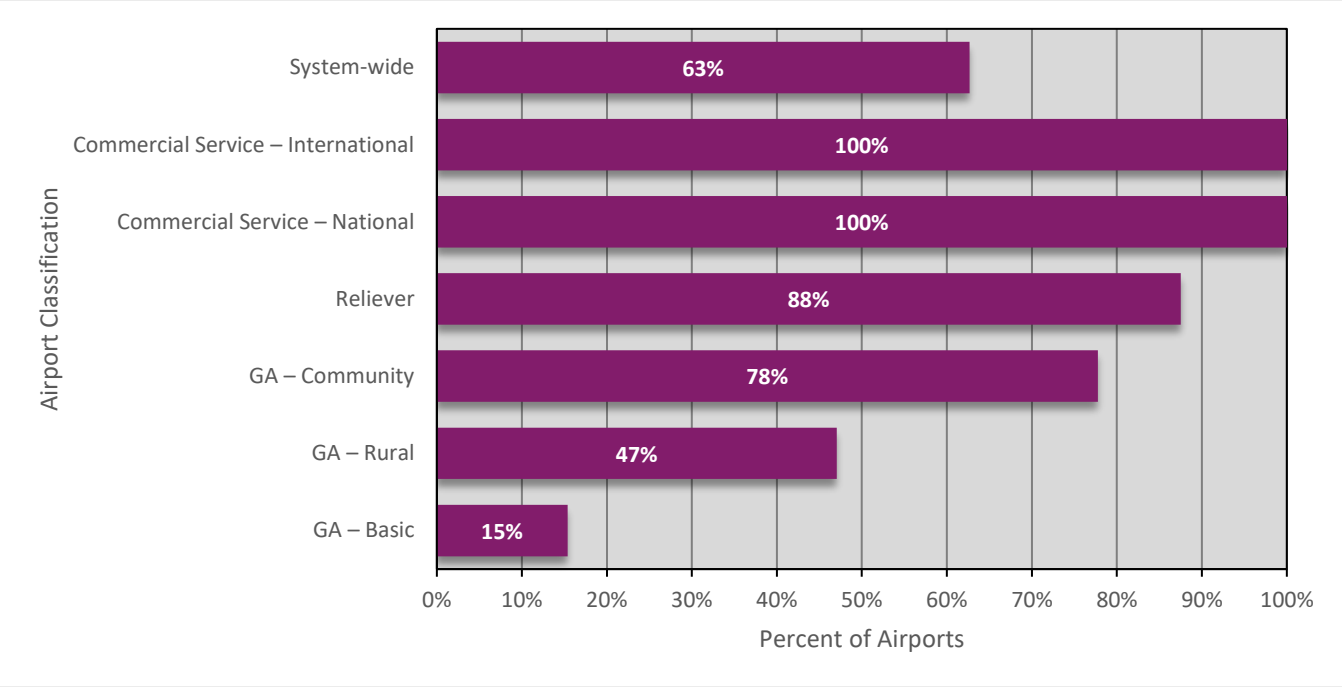
Percent of Airports that have a Written Emergency Response Plan

Federal law requires all FAA Part 139-certified airports develop and maintain an airport emergency plan in accordance with the guidance and standards in FAA AC 150/5200-31C, *Airport Emergency Plan*.[5] The use of this guidance is mandatory for Part 139-certified airports and recommended for all other airports. An emergency response plan is designed to minimize the possibility and extent of personal injury and property damage at an airport in an emergency situation. These plans are airport-specific and outline an airport's procedures during and immediately following an emergency situation and include various components depending on the airport. In general, emergency response plans include the duties and responsibilities of various parties involved in

[5] 14 CFR 139.25 provides the specific mandate for Part 139 airports regarding airport emergency plans.

disaster response, as well as communication procedures, checklists for various types of scenarios, guidance for emergency responders, and airport maps and other information.

Airports were asked if they have a written emergency response plan during the airport inventory. **Figure 12** summarizes the number of airports by classification that indicated they have adopted an emergency response plan. In total, 61 percent of all system airports have adopted an emergency response plan. One hundred percent of Commercial Service airports and nearly 90 percent of Reliever airports also have emergency response plans.



Source: Airport Inventory and Data Survey 2017

Figure 12. Percent of Airports by Classification with a Written Emergency Response Plan

Percent of Airports that Support Aerial Firefighting Operations

Forest fires are common events in Arizona, especially in the northern and eastern areas of the state where dry conditions coupled with extensive quantities of forest debris can lead to dangerous situations. To combat forest and other large fires, aircraft are used as they can quickly provide access to wide geographic areas while reducing human exposure to threats on the ground and minimizing the time it takes to extinguish the flames. Both commercial service and GA airports across the state support fire suppression response teams by providing fuel, maintenance facilities, and other critical aircraft services.

The Arizona Department of Forest and Fire Management (ADFFM) reports that nine airports are regularly used as permanent or seasonal staging areas for wildland fire suppression efforts, as summarized in **Table 2**. Four airports serve as permanent heavy air tanker bases operated by the U.S. Forest Service (USFS). Five airports serve as seasonal staging areas for single-engine air tankers (SEATs) operated by the Bureau of Land Management, ADFFM, and the Bureau of Indian Affairs (BIA). These seasonal bases are operated on a contractual basis, with a typical season lasting from May to July. The USFS, BLM, ADFFM, and BIA share

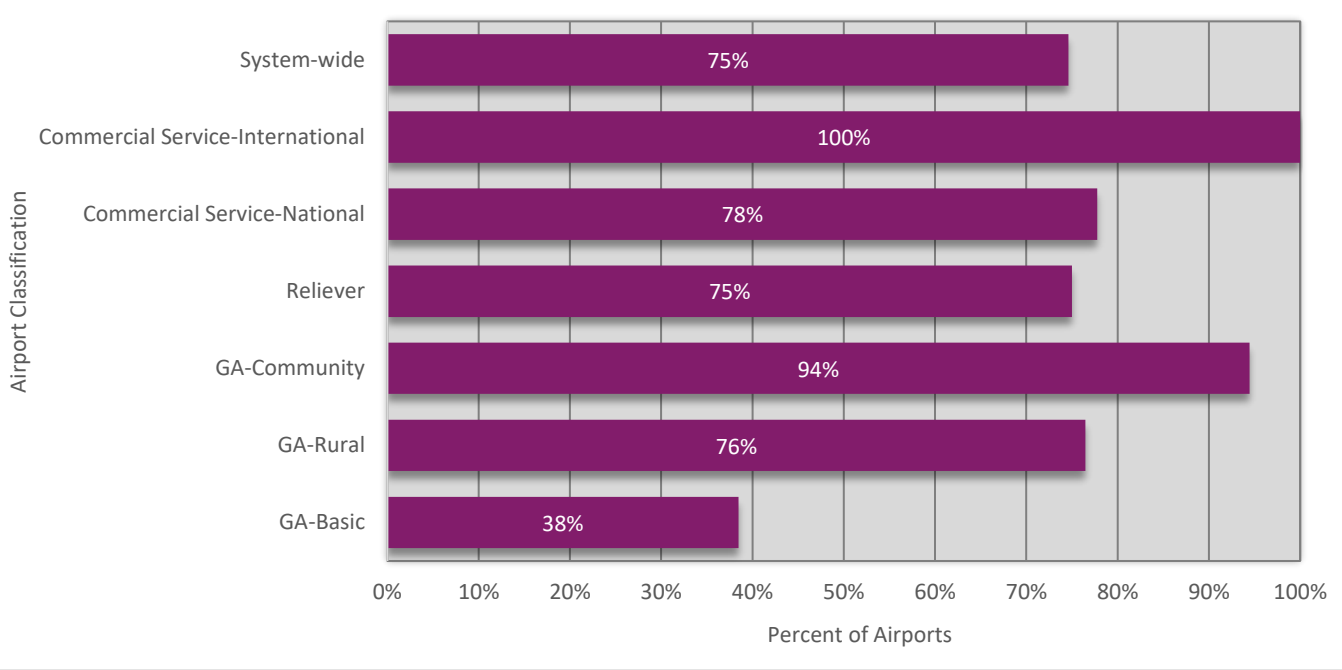
resources for fire suppression efforts and utilize one another's bases as necessary (albeit heavy air tankers are generally unable to use SEAT bases due to facility constraints).

Table 2. Airports Used as Staging Areas for Wildland Firefighting

Agency	Airport
Heavy airtanker base	
USFS	Sierra Vista Municipal-Libby Army Airfield
	Phoenix-Mesa Gateway
	Ernest A. Love Field (Prescott)
	Winslow-Lindbergh Regional
SEAT bases	
BLM	Safford Regional
	Kingman
ADFFM	Marana Regional
	Wickenburg Municipal
BIA	Show Low

Source: ADFFM 2018

Airports were asked if they support aerial firefighting operations during the airport inventory. As shown in **Figure 13**, system-wide, 75 percent of airports support aerial firefighting operations at their facilities. One hundred percent of Commercial Service-International airports serve firefighting operations, followed by 94 percent of GA-Community airports. Only 38 percent of GA-Basic airports reported support for these operations.



Source: Airport Inventory and Data Survey 2017

Figure 13. Percent of Airports by Classification Supporting Aerial Firefighting

GOAL CATEGORY: FISCAL RESPONSIBILITY

In the fiscally constrained context of the Arizona aviation system, the ADOT Aeronautics Group and airport sponsors are committed to making wise investment decisions at the state's airports. Such decisions should be founded on maximizing limited resources by proactively considering where and when improvements are required instead of reacting to facility issues as they occur. One of ADOT's top priorities is to ensure all citizens, visitors, and businesses have access to the benefits of the State's airport system. These benefits include the transportation of people and goods, as well as the many aviation functions that support safety, security, access, economic growth and development, and many other roles affecting a community's quality-of-life. Access to air service is founded on a system of airports with adequate capacity to accommodate aviation demand on the local and state levels. If users are not able to quickly and efficiently access an airport, the overall viability of the system greatly diminishes.

Performance Measures

The analysis of performance measures associated with the fiscal responsibility goal category is presented below. These performance measures include:

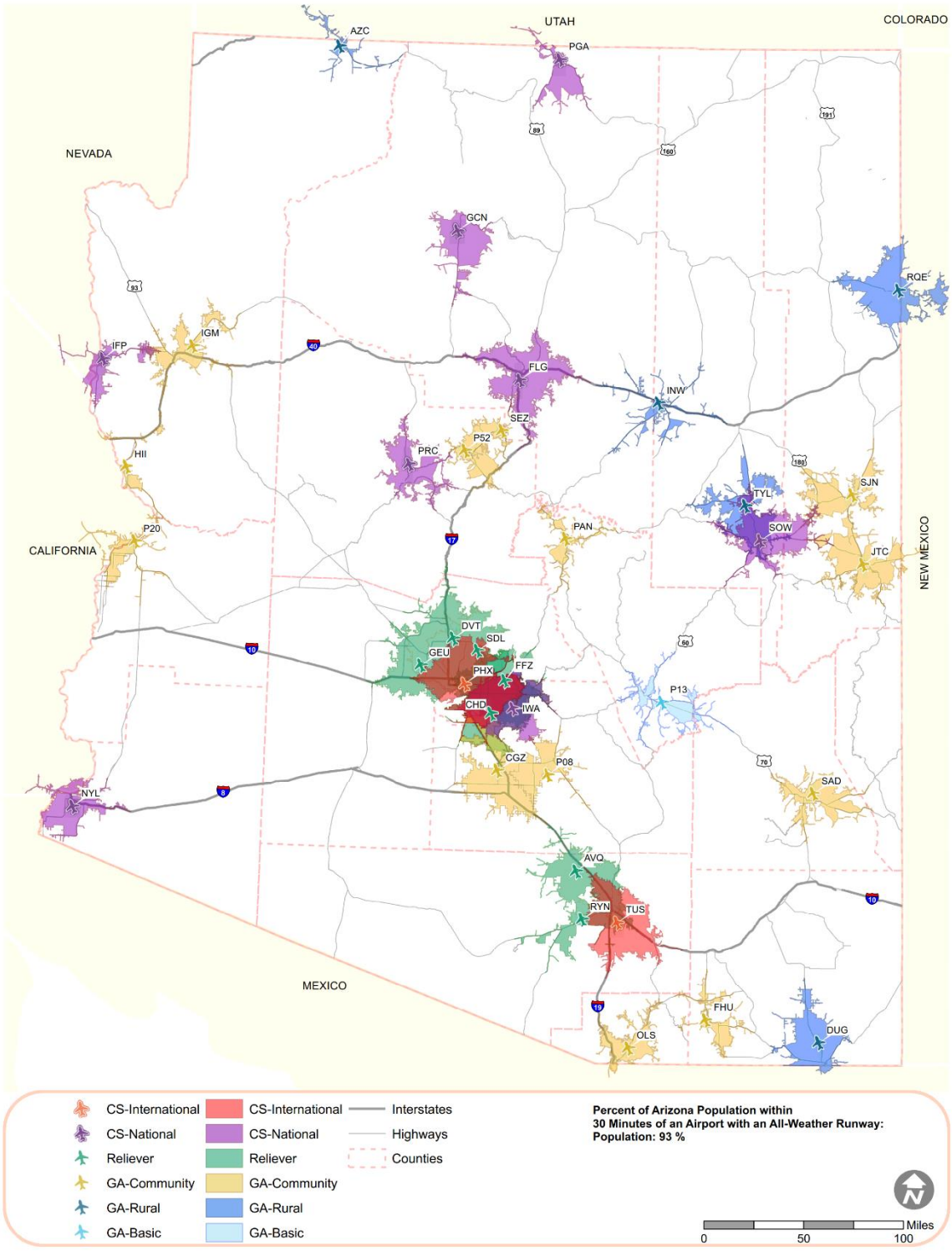
1. Percent of population within 30 minutes of an all-weather runway (paved, instrument approach, weather reporting)
2. Number of airports with a current (past five years) master plan
3. Percent of airports with a pavement condition index (PCI) of 70 or greater

Percent of Population Within 30 Minutes of an All-Weather Runway (Paved, Instrument Approach, Weather Reporting)

All-weather runways provide access to an aviation facility at all times, which can be especially important in rural areas that depend on airports for emergency response, access, and economic activities such as air cargo, agricultural support, and corporate/business aviation. They are also useful in situations where pilots have an emergency and need to land, especially during inclement weather. For purposes of the SASP Update, an all-weather runway was defined as being paved and having at least an IAP and weather reporting capability. A paved runway allows aircraft to conduct operations in wet or snowy conditions when a grass or dirt landing strip would make a take-off or landing impossible. IAPs are a series predetermined maneuvers based on the navigational aids at an airport that allow an aircraft to land in poor weather conditions when visibility is low. Surface weather conditions at airports are reported using either an Automated Weather Observing Station (AWOS) or Automated Surface Observing Station (ASOS).[6] These systems provide weather forecasts and climate information to pilots and the public, including wind speed and direction, visibility, cloud coverage, and many other outputs. Airports that are equipped with these three components allow pilots to land and take-off during times of inclement weather.

[6] While these systems have important differences, they both provide weather data and are evaluated together for the purposes of this study.

Figure 14 shows the percent of population and land area within a 30-minute drive time of airports having an all-weather runway as defined for this performance measure. Ninety-three percent of the state's total population is within a 30-minute drive time of an airport having an all-weather runway.



Sources: Airport Inventory and Data Survey 2017, FAA 5010 Master Record, Kimley-Horn

Figure 14. 30-Minute Drive Times of System Airports with an All-Weather Runway (Paved, Instrument Approach, Weather Reporting)

Number of Airports with a Current (Past Five Years) Master Plan

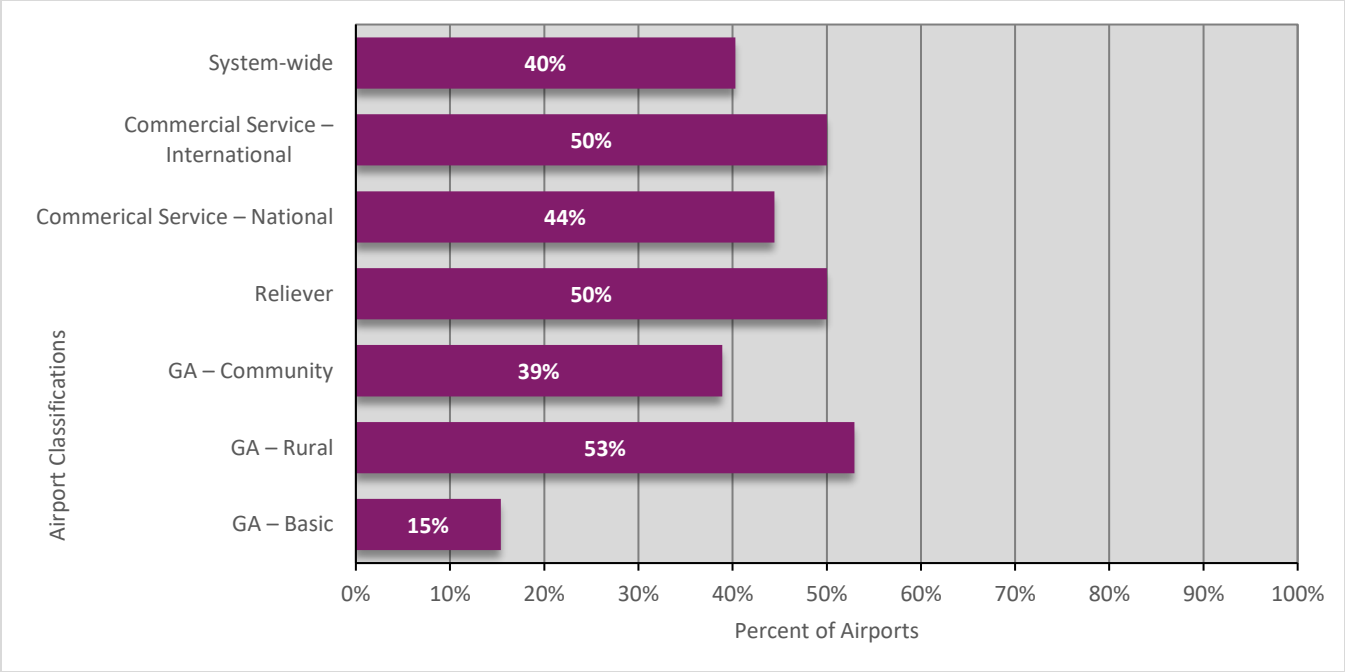
Airport master plans provide a comprehensive assessment of an airport's ability to accommodate existing and future demands and identify short-, medium-, and long-term development needs. According to FAA AC 150/5070-6B (change 2), *Airport Master Plans*, "The airport sponsor usually identifies the need for a planning study based on an existing or potential shortcoming in the existing plan or airport." Whatever these shortcomings may be—whether the result of demand exceeding capacity, new technologies entering the market, or national or local issues affecting airport activity—the completion of an airport master plan demonstrates the sponsor's commitment to responsible airport investment by ensuring resources are allocated in a manner that meets current and future needs. Additionally, inclusion in an FAA-approved master plan or airport layout plan (ALP) is typically an eligibility criterion for federal and state funding for capital improvement projects. A current master plan also indicates a community's engagement in and support for its airport.

The ADOT Aeronautics Group maintains a database of approved airport master plans at www.azdot.gov/planning/airportdevelopment/airports. Additionally, airports were asked about their most current master plan during the airport inventory. It is important to note that even if an airport has recently completed a master plan, it may not be approved by ADOT or the FAA. As noted above, this is important because a project must be in an approved master plan or ALP to receive state or federal funding. For the purpose of this analysis, a master plan is considered current if it was completed or underway in the last five years (2012 or later).

As shown in **Figure 15**, 40 percent of airports have completed an airport master plan within the last five years. The lowest percentage of GA-Basic Airports have completed these studies (15 percent), while about 40 to 50 percent of airports across all other classifications achieving this performance measure.[7] On average, airports falling outside of the five-year threshold completed their master plans in 2006-2007, although this timeframe may be misleading, as some master plans are considerably outdated.

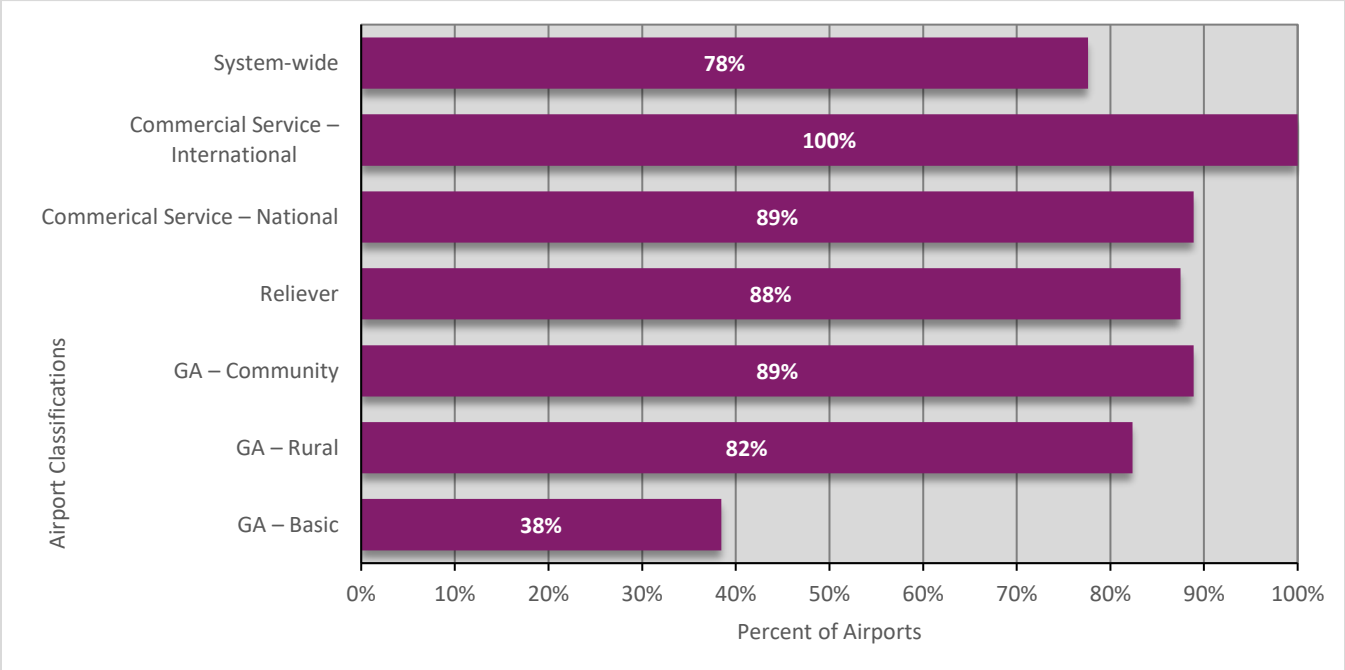
To more accurately gauge airport activity regarding master planning efforts, a 10-year threshold was also evaluated, which more accurately reflects the frequency at which many airports update their master plans (2007 or later). As summarized in **Figure 16**, the percent of all airports that have completed a master plan within the last 10 years significantly increases to 78 percent (25 more airports than the five-year threshold). This figure encompasses 100 percent of Commercial Service-International, 89 percent of Commercial Service-National airports, and 82 to 88 percent of all GA classifications except GA-Basic. While lower than the other classifications, 38 percent of GA-Basic airports have completed master plans within the past 10 years, a notable increase over the five-year rate.

[7] Note that three GA-Basic airports were unable to determine the year of their most recent master plans. It has been assumed that these airports completed planning studies outside of the five-year threshold for the purpose of this evaluation.



Source: Airport Inventory and Data Survey 2017

Figure 15. Percent of Airports by Classification Within the Past Five Years



Source: Airport Inventory and Data Survey 2017

Figure 16. Percent of Airports by Classification with a Master Plan Within the Past 10 Years

In addition to assessing the most recent completion date of airport master plans, **Table 3** reports the most recent data for ALPs as recorded by the FAA. According to the FAA, 42 of the 67 airports (63 percent) have completed ALPs since 2012. Airports were also asked for their most recent ALPs during the inventory process. Data provided by airports were used for airports for which the FAA did not have a recorded ALP, including non-NPIAS airports.

Table 3. ALPs at Arizona Airports by Year

Associated City	Airport	ALP Date
Commercial Service-International		
Phoenix	Phoenix Sky Harbor International	2011
Tucson	Tucson International	2014
Commercial Service-National		
Bullhead City	Laughlin/Bullhead City International	2010
Flagstaff	Flagstaff Pulliam	2008
Grand Canyon	Grand Canyon National Park	2014
Page	Page Municipal	2009
Peach Springs	Grand Canyon West	2015
Phoenix	Phoenix-Mesa Gateway	2015
Prescott	Ernest A. Love Field	2014
Show Low	Show Low Regional	2005
Yuma	Yuma International	2012
Reliever		
Chandler	Chandler Municipal	2017
Glendale	Glendale Municipal	2017
Goodyear	Phoenix Goodyear	2017
Marana	Marana Regional	2017
Mesa	Falcon Field	2016
Phoenix	Phoenix Deer Valley	2015
Scottsdale	Scottsdale	2013
Tucson	Ryan Field	2011
GA-Community		
Benson	Benson Municipal	2010
Buckeye	Buckeye Municipal	2012
Casa Grande	Casa Grande Municipal	2015
Coolidge	Coolidge Municipal	2013
Cottonwood	Cottonwood Municipal	2006
Kingman	Kingman	2009
Lake Havasu City	Lake Havasu City	2010
Marana	Pinal Airpark	2015
Nogales	Nogales	2015
Parker	Avi Suquilla	2016
Payson	Payson	2014
Safford	Safford Regional	2012
Sedona	Sedona	2017
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	2014
Springerville	Springerville Municipal	2010
St. Johns	St. Johns Industrial Air Park	2013
Wickenburg	Wickenburg Municipal	2014
Willcox	Cochise County	2015

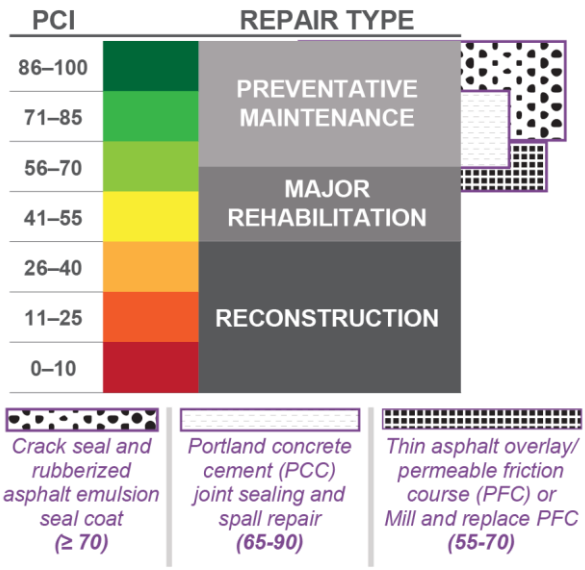
Associated City	Airport	ALP Date
	GA-Rural	
Bisbee	Bisbee Municipal	2011
Chinle	Chinle Municipal	2016
Colorado City	Colorado City Municipal	2009
Douglas	Bisbee-Douglas International	2015
Douglas	Cochise College	Unknown
Douglas	Douglas Municipal	2017
Eloy	Eloy Municipal	2013
Gila Bend	Gila Bend Municipal	2014
Holbrook	Holbrook Municipal	2015
Maricopa	Ak-Chin Regional	2016
San Luis	Rolle Airfield	2016
San Manuel	San Manuel	2015
Taylor	Taylor	2010
Whiteriver	Whiteriver	2009
Williams	H.A. Clark Memorial Field	2008
Window Rock	Window Rock	2016
Winslow	Winslow-Lindbergh Regional	2015
	GA-Basic	
Ajo	Eric Marcus Municipal	2010
Bagdad	Bagdad	2015
Cibecue	Cibecue	2006
Clifton	Greenlee County	2012
Globe	San Carlos Apache	2007
Kayenta	Kayenta	2010
Kearny	Kearny	Unknown
Polacca	Polacca	Unknown
Seligman	Seligman	2005
Sells	Sells	Unknown
Superior	Superior	2018
Tombstone	Tombstone Municipal	Unknown
Tuba City	Tuba City	2016

Source: FAA – December 2017

Percent of Airports with a Pavement Condition Index of 70 or Greater

Pavement condition is critical to the safe and efficient operation of aircraft at airports, and its upkeep is often one of the most significant capital investments an airport makes. The PCI is an industry standard for measuring and rating airport pavements so that maintenance and repair can be planned and implemented at the appropriate time during its lifecycle. PCI is expressed on a scale from 0 (failed pavement) to 100 (new pavement in perfect condition), as seen in **Figure 17**. Pavement with a PCI of 56 to 100 is eligible to receive a preventative maintenance treatment, while a PCI below this threshold requires a major rehabilitation or reconstruction. Because preventative maintenance is significantly less costly than a major rehabilitation or reconstruction, the FAA strongly encourages preventative maintenance. Pavement with a PCI of 70 or greater is considered to be in "good" condition and therefore 70 serves as the threshold for this performance measure.

As discussed in **Chapter 2: Review of Current Policy**, the ADOT Aeronautics Group assists airports in conducting PCIs through the Airport Pavement Management System (APMS) Program. This program triennially inventories the PCI of all airside pavement (runways, taxiways, aprons, etc.) at Arizona's system airports. This analysis utilized the data gathered from the 2017 Arizona APMS Update Summary Report. Overall PCIs were available for 64 SASP airports. Two airports had unpaved runways and therefore, no PCI was available. PCI data was not available for one airport. PCI ratings for all pavements (overall) and for each airport's primary runway are presented by airport and by classification in **Table 4**.



Source: ADOT 2017

Figure 17. PCI Index and ADOT's Maintenance Project Thresholds

Table 4. PCI Ratings at Individual Airports

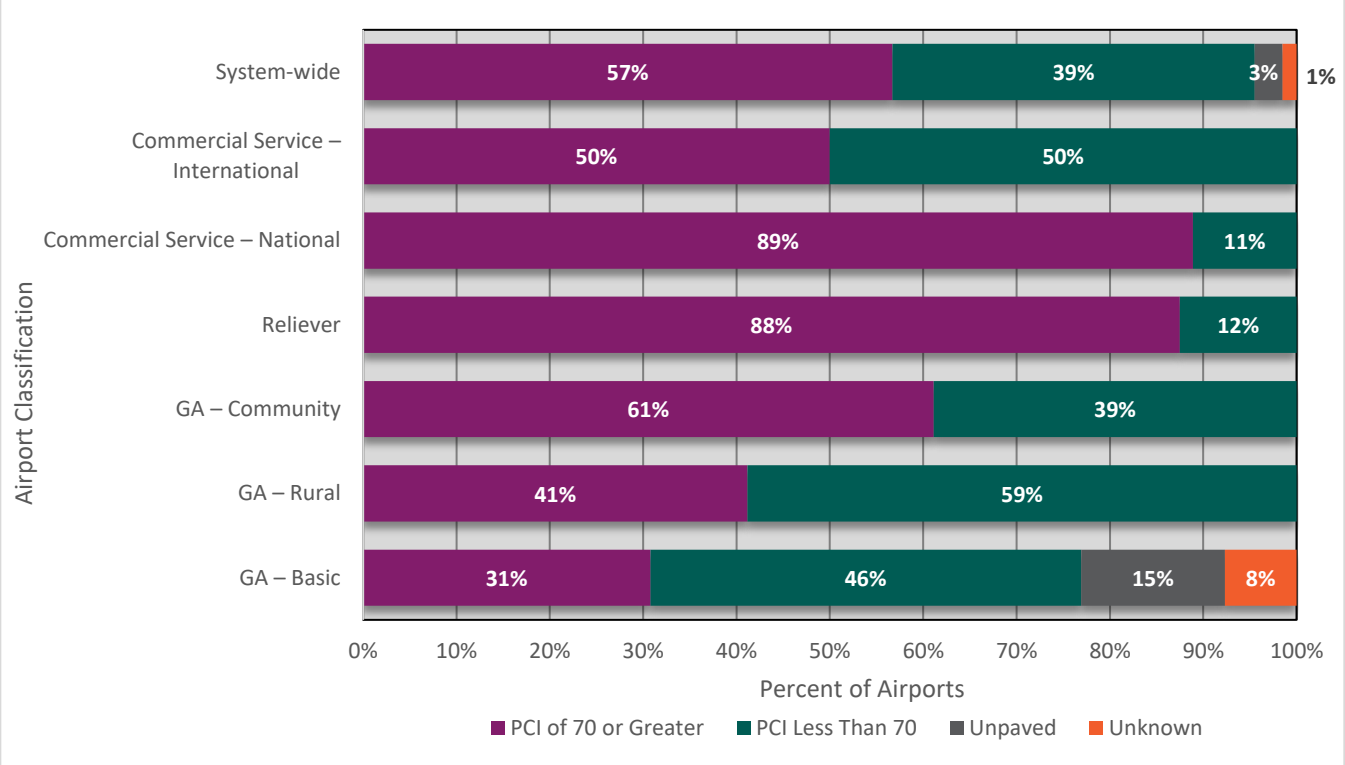
Associated City	Airport	Overall PCI	Primary Runway PCI	Overall PCI Compliance	Primary Runway PCI Compliance
Commercial Service-International					
Phoenix	Phoenix Sky Harbor International	86	93	Yes	Yes
Tucson	Tucson International	69	73	No	Yes
Commercial Service-National					
Bullhead City	Laughlin/Bullhead City Int'l	83	97	Yes	Yes
Flagstaff	Flagstaff Pulliam	92	100	Yes	Yes
Grand Canyon	Grand Canyon National Park	73	69	Yes	No
Page	Page Municipal	77	92	Yes	Yes
Peach Springs	Grand Canyon West	87	86	Yes	Yes
Phoenix	Phoenix-Mesa Gateway	89	89	Yes	Yes
Prescott	Ernest A. Love Field	73	73	Yes	Yes
Show Low	Show Low Regional	59	52	No	No
Yuma	Yuma International	81	Unknown	Yes	Unknown
Reliever					
Chandler	Chandler Municipal	70	84	Yes	Yes
Glendale	Glendale Municipal	70	76	Yes	Yes
Goodyear	Phoenix Goodyear	76	91	Yes	Yes
Marana	Marana Regional	67	100	No	Yes
Mesa	Falcon Field	74	79	Yes	Yes
Phoenix	Phoenix Deer Valley	78	77	Yes	Yes
Scottsdale	Scottsdale	77	80	Yes	Yes

Associated City	Airport	Overall PCI	Primary Runway PCI	Overall PCI Compliance	Primary Runway PCI Compliance
Tucson	Ryan Field	84	79	Yes	Yes
		GA-Community			
Benson	Benson Municipal	80	90	Yes	Yes
Buckeye	Buckeye Municipal	72	100	Yes	Yes
Casa Grande	Casa Grande Municipal	69	75	No	Yes
Coolidge	Coolidge Municipal	53	50	No	No
Cottonwood	Cottonwood Municipal	77	99	Yes	Yes
Kingman	Kingman	64	72	No	Yes
Lake Havasu City	Lake Havasu City	54	65	No	No
Marana	Pinal Airpark	57	94	No	Yes
Nogales	Nogales	71	63	Yes	No
Parker	Avi Suquilla	69	65	No	No
Payson	Payson	72	98	Yes	Yes
Safford	Safford Regional	79	95	Yes	Yes
Sedona	Sedona	82	100	Yes	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	85	Unknown	Yes	No
Springerville	Springerville Municipal	74	76	Yes	Yes
St. Johns	St. Johns Industrial Air Park	66	65	No	No
Wickenburg	Wickenburg Municipal	80	80	Yes	Yes
Willcox	Cochise County	75	79	Yes	Yes
		GA-Rural			
Bisbee	Bisbee Municipal	59	85	No	Yes
Chinle	Chinle Municipal	34	32	No	No
Colorado City	Colorado City Municipal	88	91	Yes	Yes
Douglas	Bisbee-Douglas International	48	62	No	No
Douglas	Cochise College	59	80	No	Yes
Douglas	Douglas Municipal	37	27	No	No
Eloy	Eloy Municipal	70	76	Yes	Yes
Gila Bend	Gila Bend Municipal	76	73	Yes	Yes
Holbrook	Holbrook Municipal	58	34	No	No
Maricopa	Ak-Chin Regional	63	61	No	No
San Luis	Rolle Airfield	80	85	Yes	Yes
San Manuel	San Manuel	87	85	Yes	Yes
Taylor	Taylor	82	84	Yes	Yes
Whiteriver	Whiteriver	68	72	No	Yes
Williams	H.A. Clark Memorial Field	85	100	Yes	Yes
Window Rock	Window Rock	13	13	No	No
Winslow	Winslow-Lindbergh Regional	61	60	No	No
		GA-Basic			
Ajo	Eric Marcus Municipal	47	64	No	No
Bagdad	Bagdad	68	70	No	Yes
Cibecue	Cibecue	Unpaved	Unpaved	Unpaved	Unpaved
Clifton	Greenlee County	64	68	No	No

Associated City	Airport	Overall PCI	Primary Runway PCI	Overall PCI Compliance	Primary Runway PCI Compliance
Globe	San Carlos Apache	81	100	Yes	Yes
Kayenta	Kayenta	85	100	Yes	Yes
Kearny	Kearny	50	51	No	No
Polacca	Polacca	11	6	No	No
Seligman	Seligman	76	83	Yes	Yes
Sells	Sells	Unknown	Unknown	Unknown	Unknown
Superior	Superior	Unpaved	Unpaved	Unpaved	Unpaved
Tombstone	Tombstone Municipal	69	70	No	Yes
Tuba City	Tuba City	76	81	Yes	Yes

Source: Arizona APMS Update Summary Report 2017

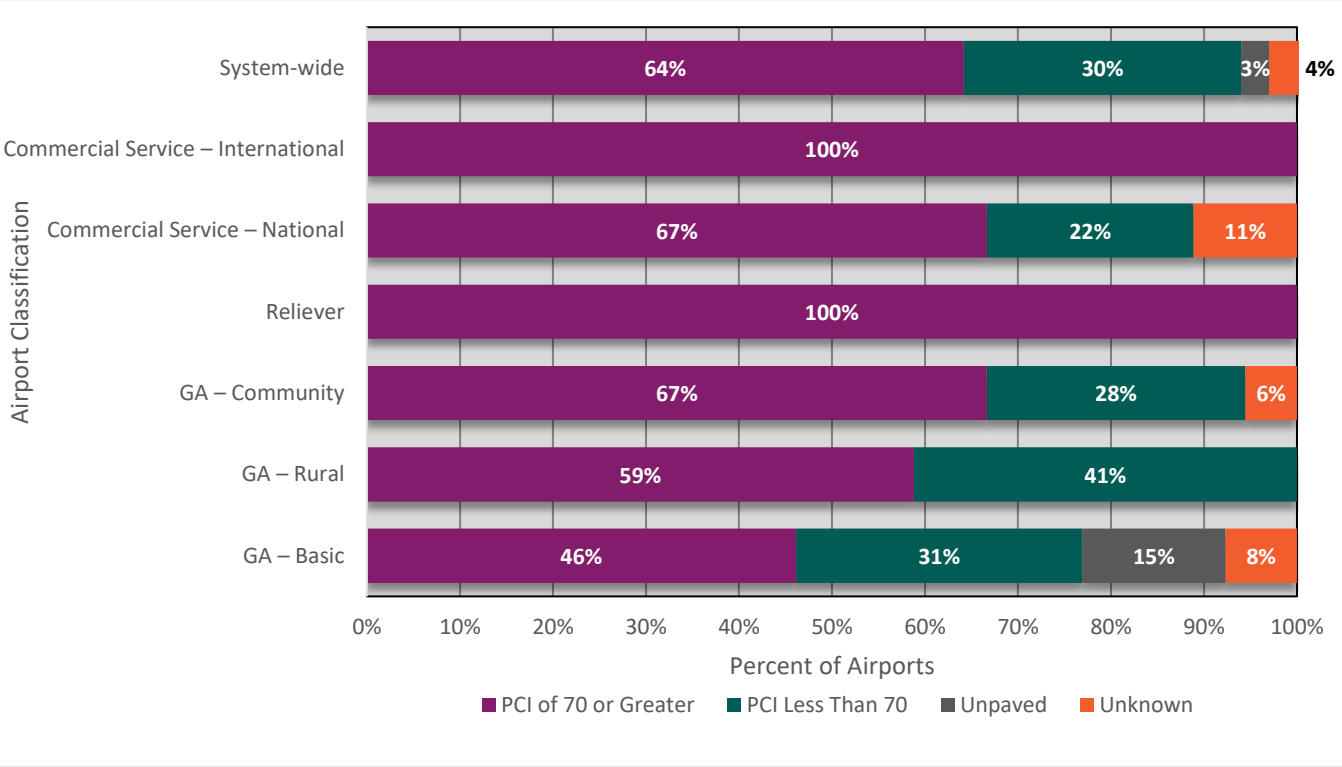
Figure 18 presents overall PCI compliance at Arizona airports. Fifty-seven percent of airports system-wide have an overall PCI of 70 or greater. Commercial Service-International and Reliever airports have the largest percentage of overall PCIs greater than or equal to 70.



Source: ADOT Arizona APMS Summary Report 2017

Figure 18. Percent of Airports by Classification Meeting Overall PCI Compliance

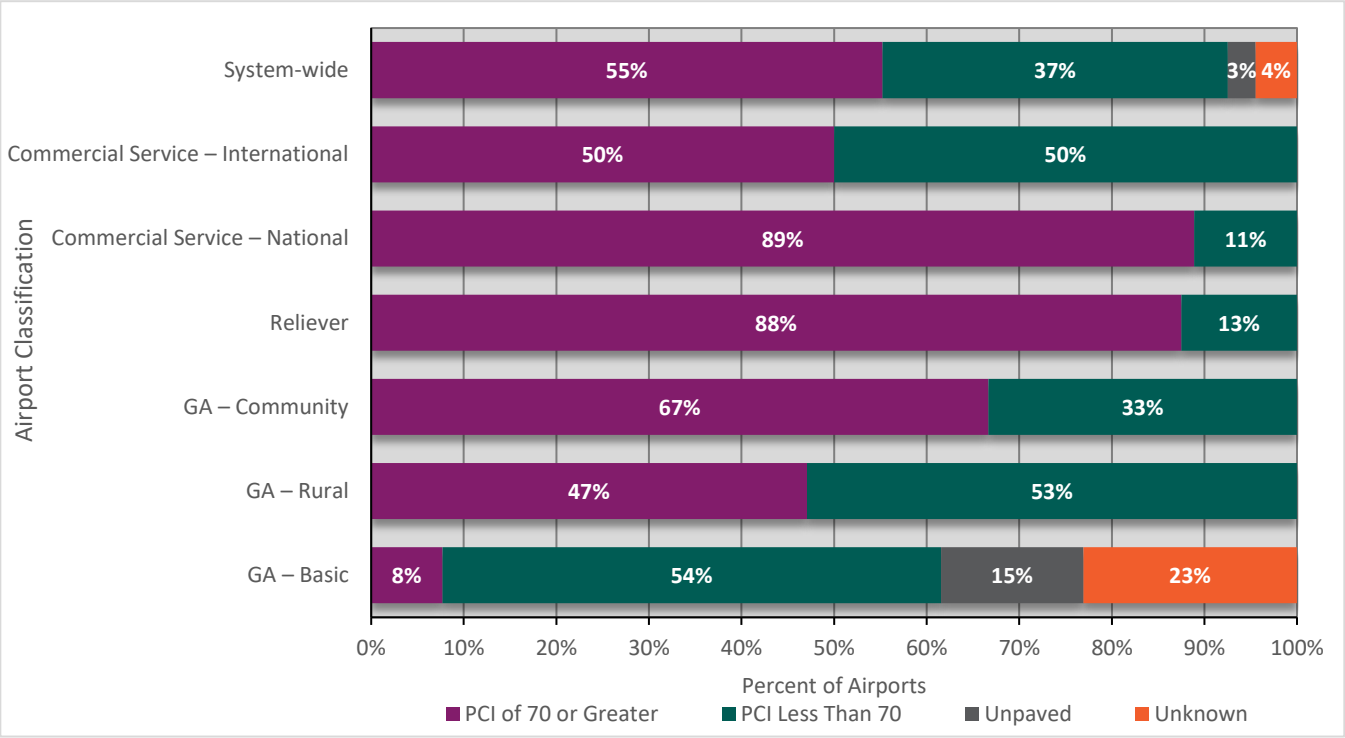
Figure 19 summarizes PCI compliance of primary runways at Arizona airports. State-wide, 64 percent of primary runways at system airports have a PCI greater than or equal to 70. All eight Reliever as well as both Commercial Service-International airports' primary runways are compliant.



Source: Arizona APMS Summary Report 2017

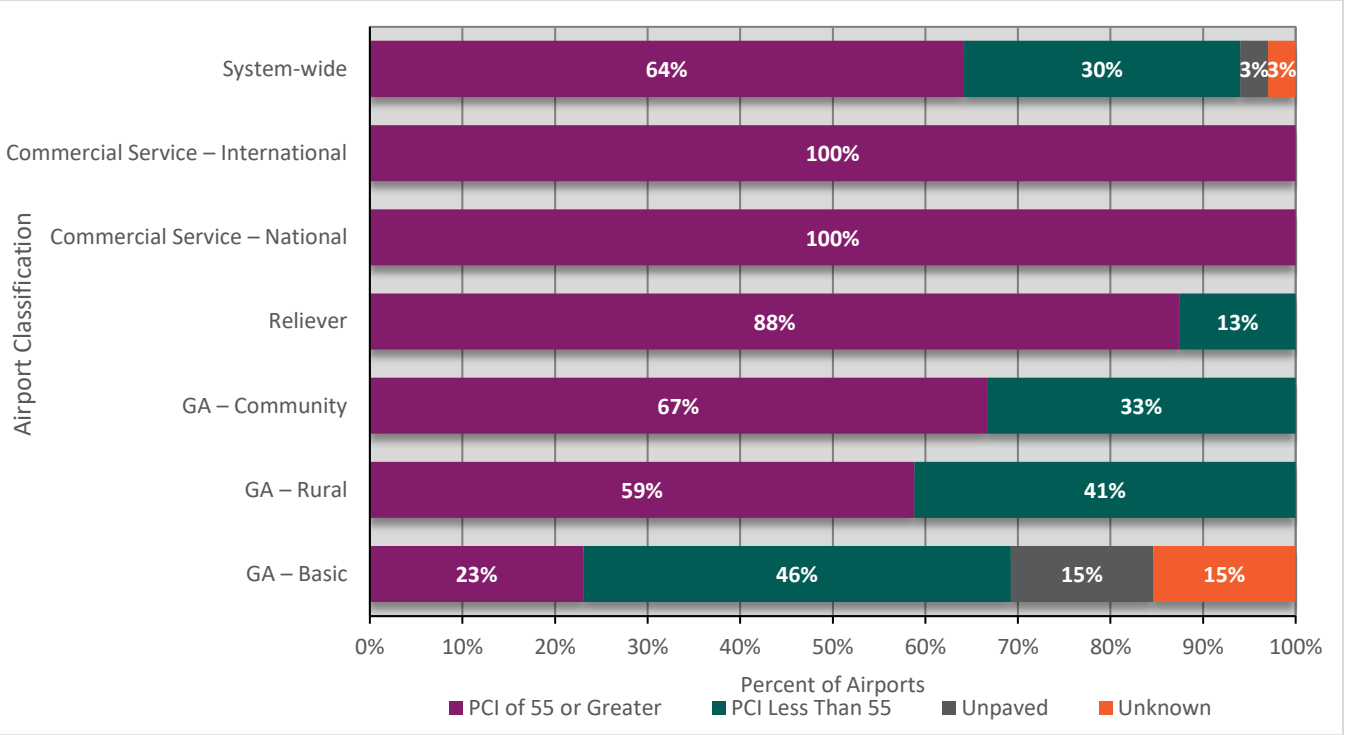
Figure 19. Percent of Airports by Classification Meeting Primary Runway PCI Compliance

In addition to evaluating airports' overall and primary runway PCIs, taxiway and ramp pavements were reviewed independently. Airports do not need to maintain the same pavement conditions for runways, taxiways, and aprons for safe aircraft operations. For example, some airports have large apron areas that are left unused with minimal upkeep, as improvements must be prioritized to those facilities with the greatest impact on safety and efficiency. Accordingly, taxiways were evaluated for PCI of greater than or equal to 70 (**Figure 20**), while aprons were reviewed for a PCI greater or equal to 55 (**Figure 21**).



Source: Arizona APMS Summary Report 2017

Figure 20. Airports Meeting Primary Taxiway PCI Compliance (≥70)



Source: Arizona APMS Summary Report 2017

Figure 21. Airports Meeting Apron PCI Compliance (≥55)

System Indicators

The following section provides an analysis of the percent of statewide population within a 30-minute drive time of each airport, by role classification; followed by an analysis of the system indicators of the fiscal responsibility goal. System indicators of the fiscal responsibility goal include:

1. Percent of statewide population within a 30-minute drive time of each airport, by role classification
2. Percent of population within 30 minutes of a NPIAS airport
3. Percent of communities in the state with a population greater than 1,000 with a 30-minute drive time of a GA airport
4. Percent of population within 30 minutes of a system airport meeting business user needs
5. Number of airports with utilities (i.e., electricity, telephone, water, sewer, and gas)

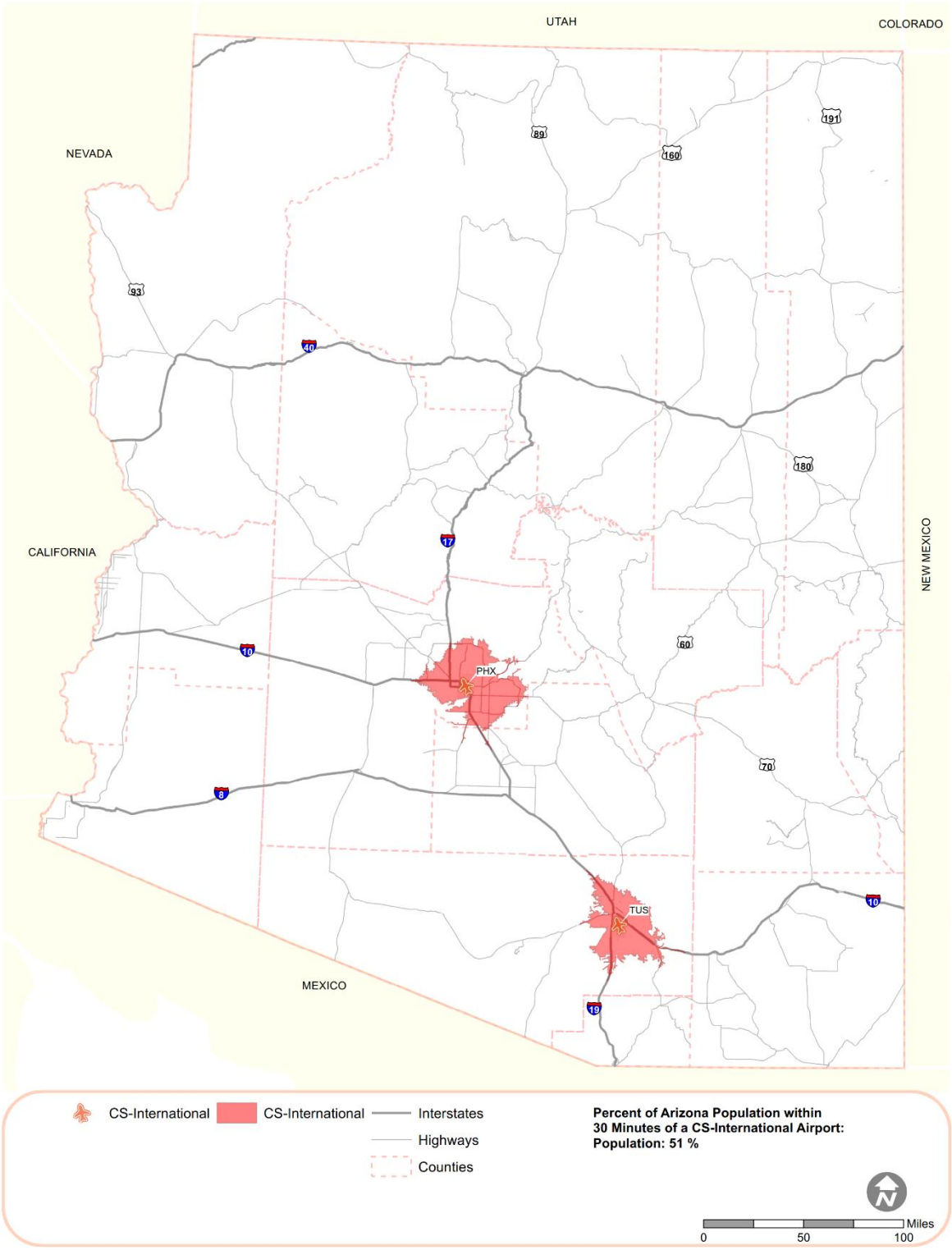
Percent of Statewide Population Within a 30-Minute Drive Time of Each Airport, by Role Classification

As described in **Chapter 5: Airport Classification Analysis**, Arizona system airports support various levels and types of aviation activity. The state's six classifications reflect the unique roles airports play in the state, as well as on regional and local levels. This analysis evaluated residents' access to each classification of commercial service and GA airports, then combined the analyses to show the population's access to any system airport.[8] The cumulative analysis reflects the capacity of larger airports to also serve the needs of users that typically use smaller airports, especially for small GA aircraft with the ability land at any size airport. This combined analysis reflects the additional population accessibility that is provided by adding airport classifications together.

Figure 22 through **Figure 27** depict 30-minute drive times for each individual role category. Fifty-one percent of the population is within a 30-minute drive time of a Commercial Service-International Airport, followed by 28 percent for Commercial Service-National, 70 percent for Reliever, 17 percent for GA-Community, four percent for GA-Rural, and one percent for GA-Basic.[9] These reflect the population associated only with that classification, not the cumulative population or duplicative population served as the coverages are combined. Where duplication exists within an individual classification, the population was only counted once.

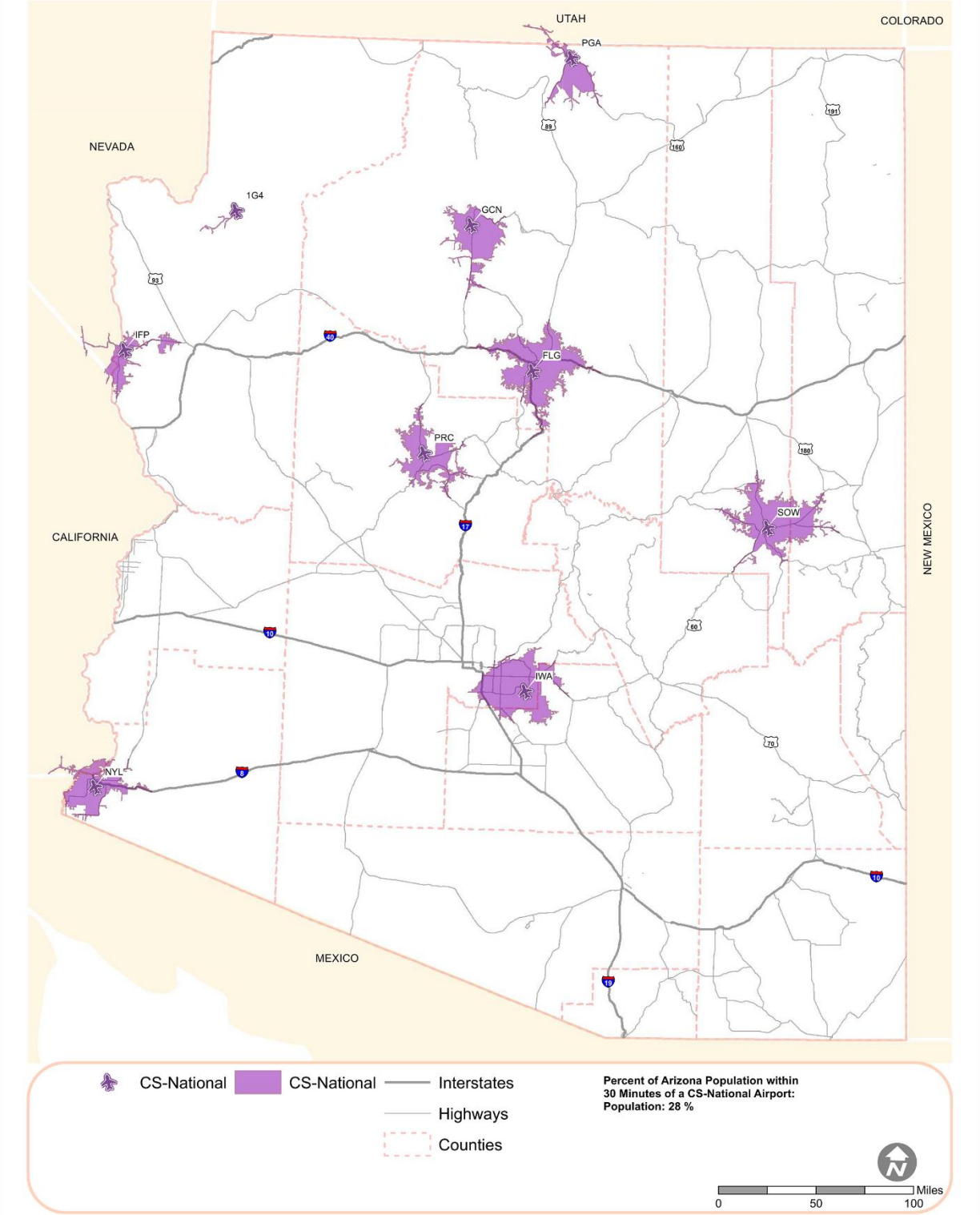
[8] Laughlin/Bullhead City International Airport (IFP) is classified as a Commercial Service-National Airport in the 2018 SASP Update. While the airport does have scheduled commercial service, these flights are operated by the casinos on the west side of the Colorado River in Laughlin, Nevada. Private individuals do not have access to these flights. A footnote has been added to those maps in which the absence of commercial service at IFP impacts population coverage.

[9] Coverage drops to 27 percent for Commercial Service-National when IFP is removed from the analysis.



Sources: Kimley-Horn 2018, Environmental Systems Research Institute (ESRI) Community Analyst 2017

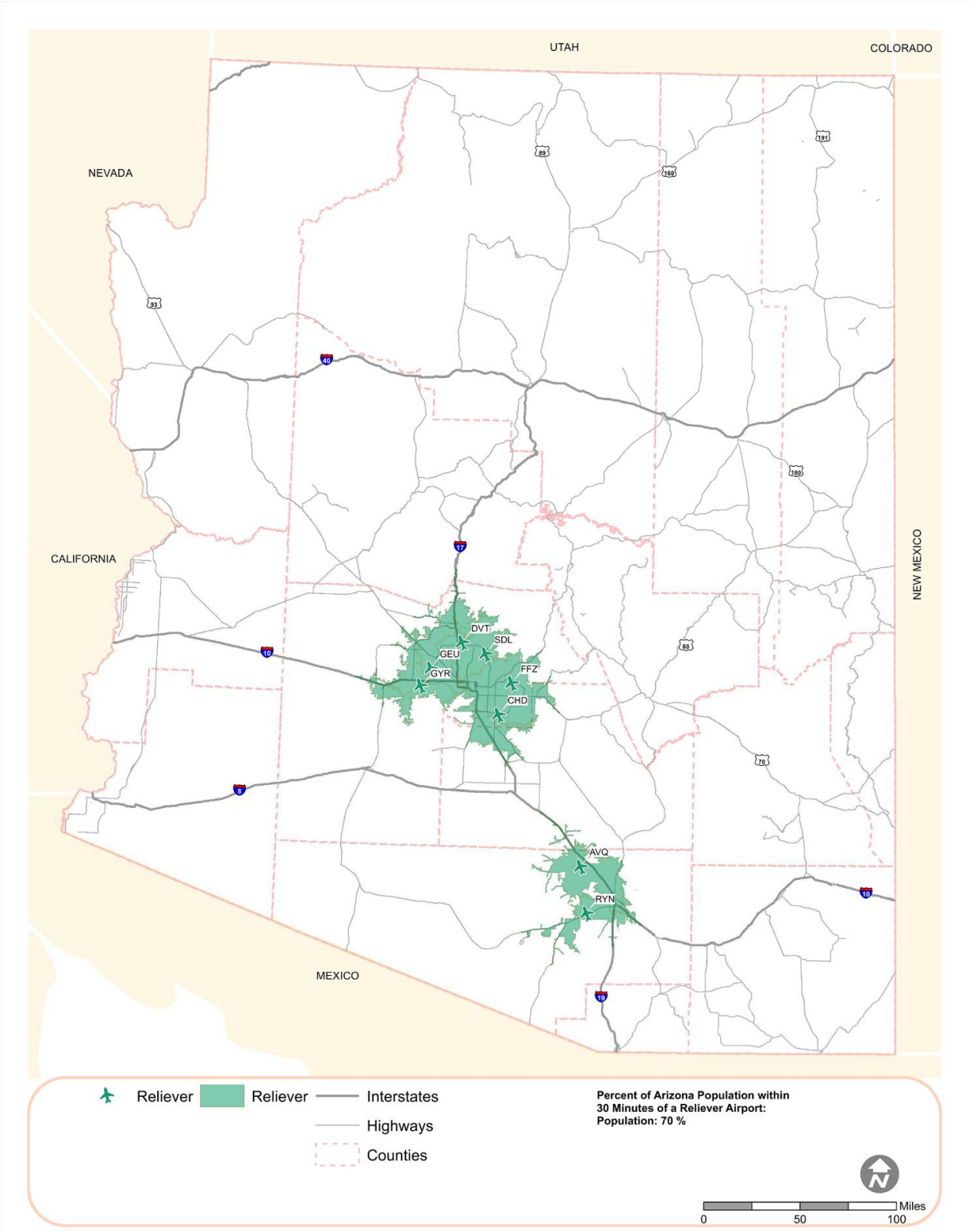
Figure 22. 30-Minute Drive Times of Commercial Service-International Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

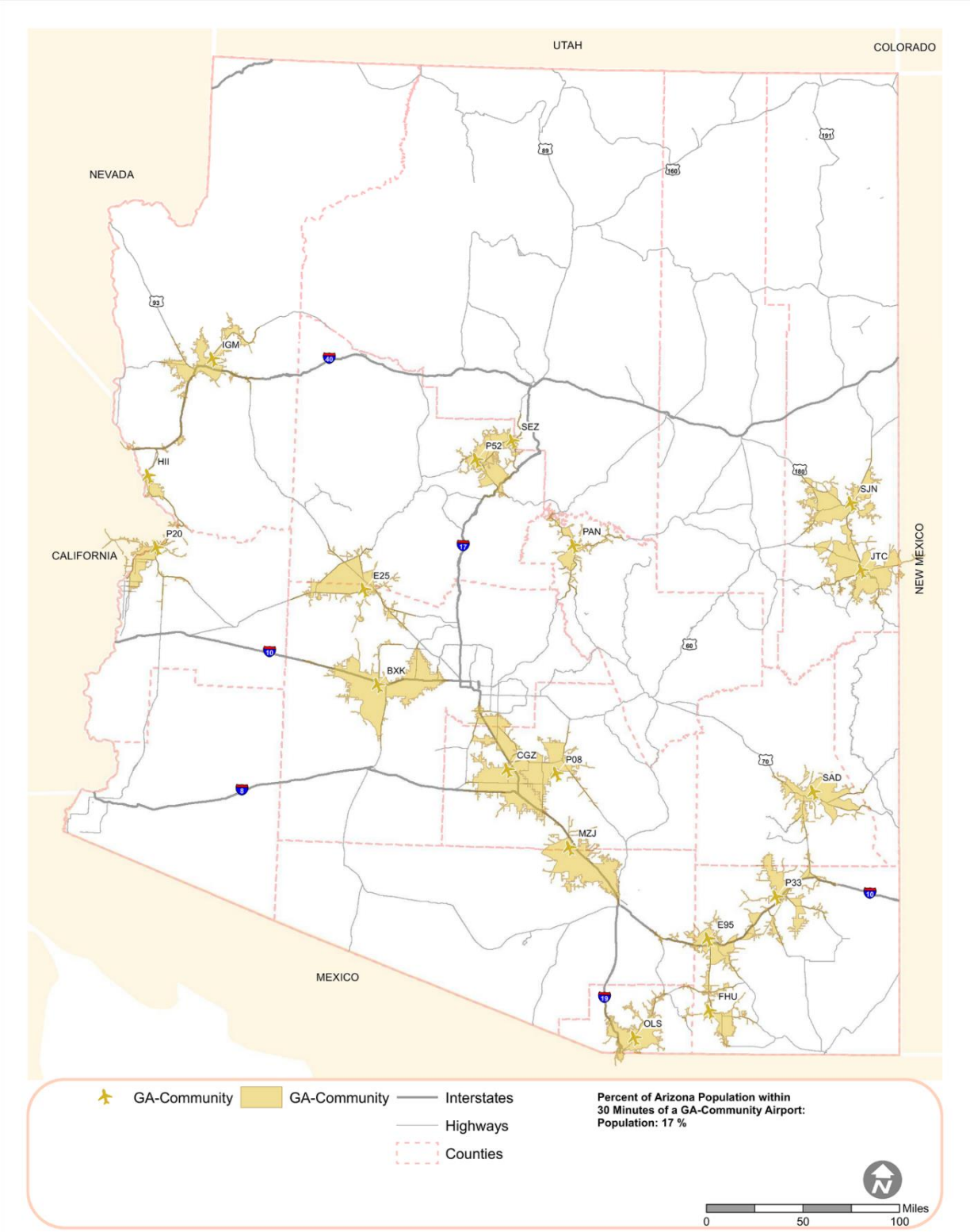
Figure 23. 30-Minute Drive Times of Commercial Service-National Airports[10]

[10] Population coverage drops to 27 percent when IFP is removed from the analysis.



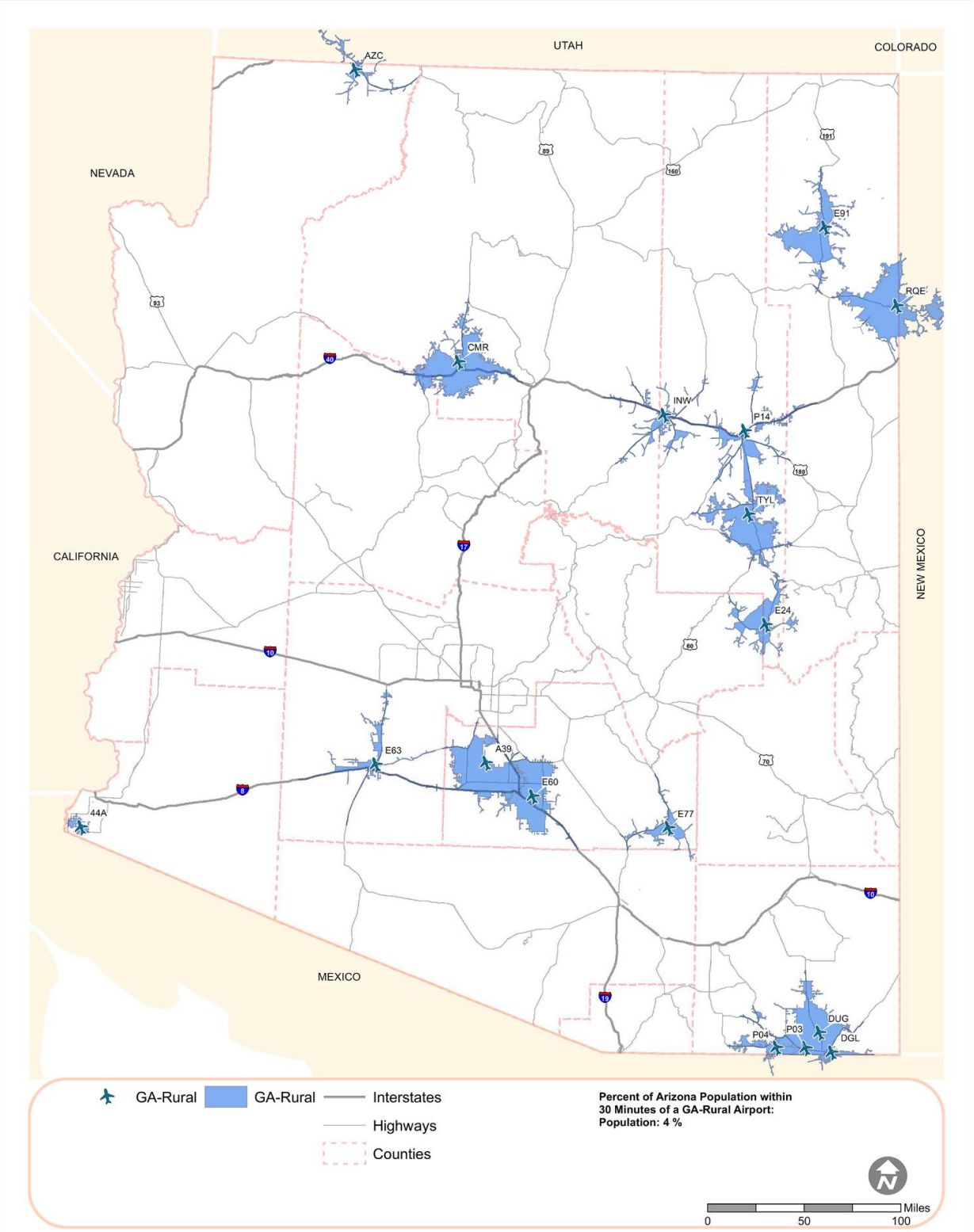
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 24. 30-Minute Drive Times of Reliever Airports



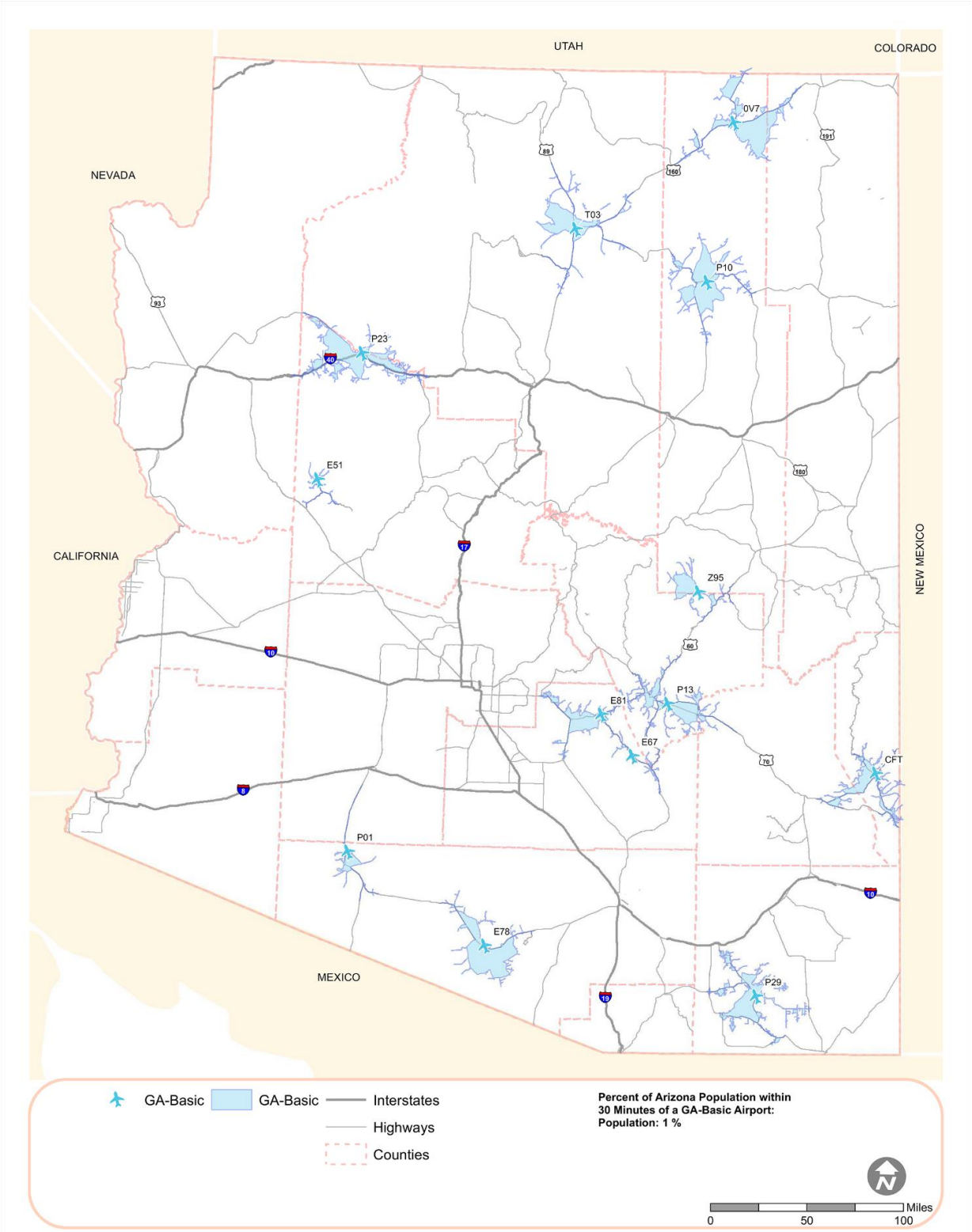
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 25. 30-Minute Drive Times of GA-Community Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 26. 30-Minute Drive Times of GA-Rural Airports



Source: Kimley-Horn 2018, ESRI Community Analyst 2017

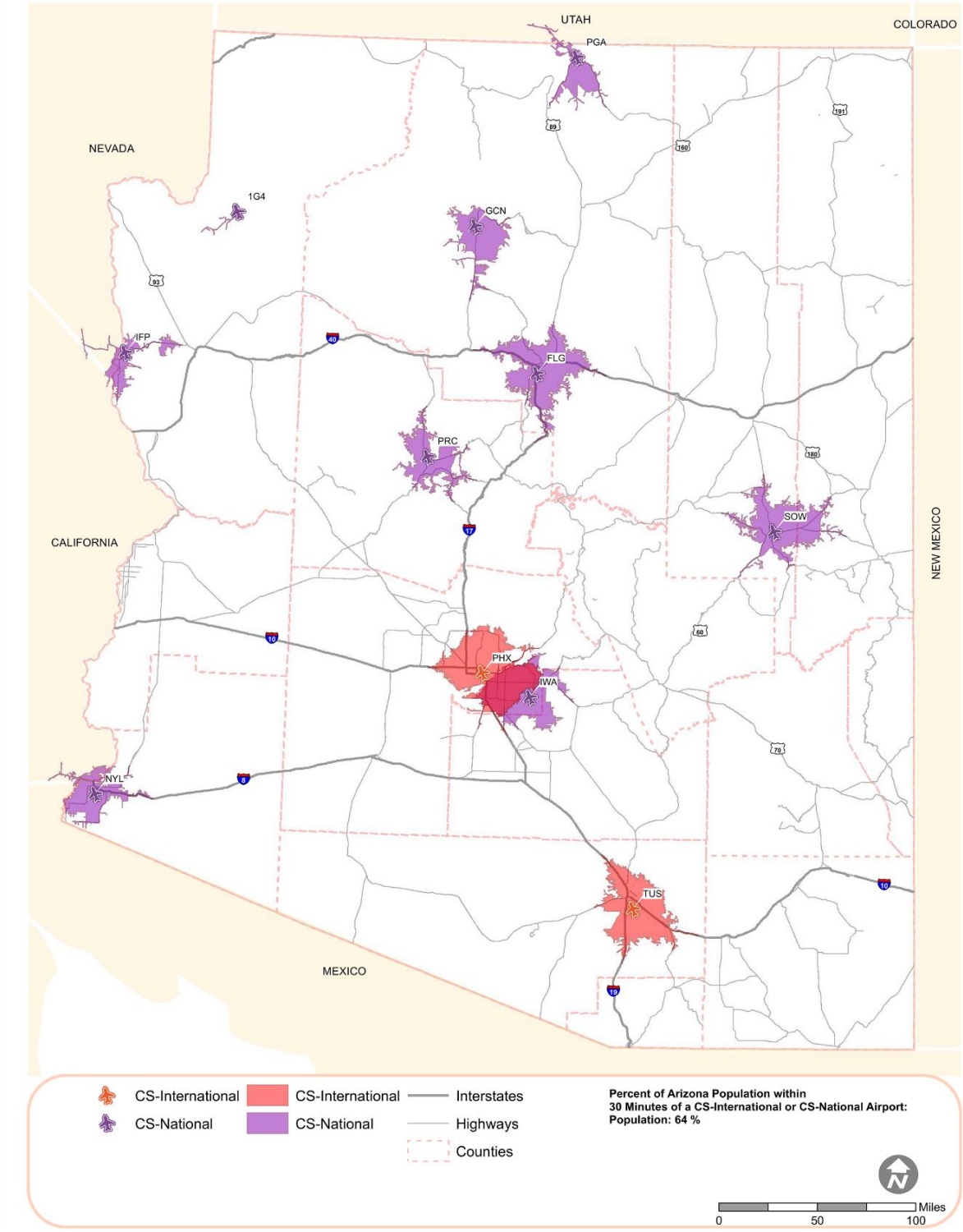
Figure 27. 30-Minute Drive Times of GA-Basic Airports

Another component of the 30-minute drive time analysis is pairing the airport classifications one-by-one to determine an all-airport 30-minute drive time coverage in Arizona. Combination population coverage of the SASP airports are as follows:

1. Commercial Service-International and Commercial Service-National airports (64 percent population coverage)[11]
2. Commercial Service-International, Commercial Service-National, and Reliever airports (83 percent population coverage)[12]
3. Commercial Service-International, Commercial Service-National, Reliever, and GA-Community airports (91 percent population coverage)
4. Commercial Service-International, Commercial Service-National, Reliever, GA-Community, and GA-Rural airports (93 percent population coverage)
5. All SASP airports (93 percent population coverage)[13]

Figure 28 through **Figure 32** depict combination population coverage at SASP airports by airport classification. It should be noted that American Airlines stopped serving IFP shortly after the Airport Inventory and Data Survey. Sun Country and Elite Airways continue to serve IFP, however, the service is not available to the public. Because of this technicality, drive time exclusions for IFP are footnoted which address commercial service at the airport in 2018. Please note that colors appear darker and more pronounced in those areas in which coverage overlaps between classifications.

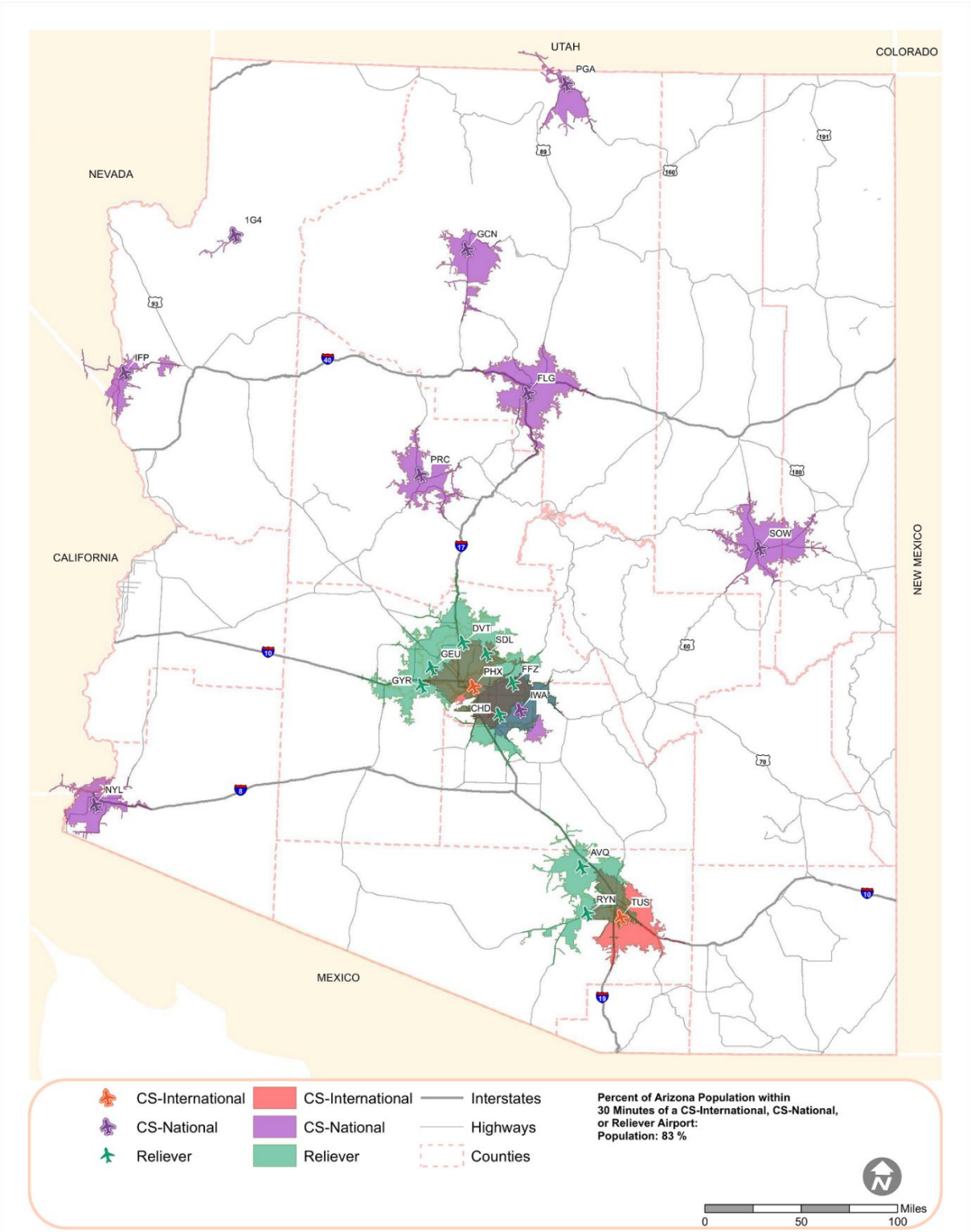
[11] Population coverage drops to 62 percent when IFP is removed from the analysis.
[12] Population coverage will remain at 83 percent in this evaluation, as IFP continues to support GA activity for the local population similar in frequency and type as a Reliever airport.
[13] Population coverage at GA-Basic airports were less than one percent.



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017.

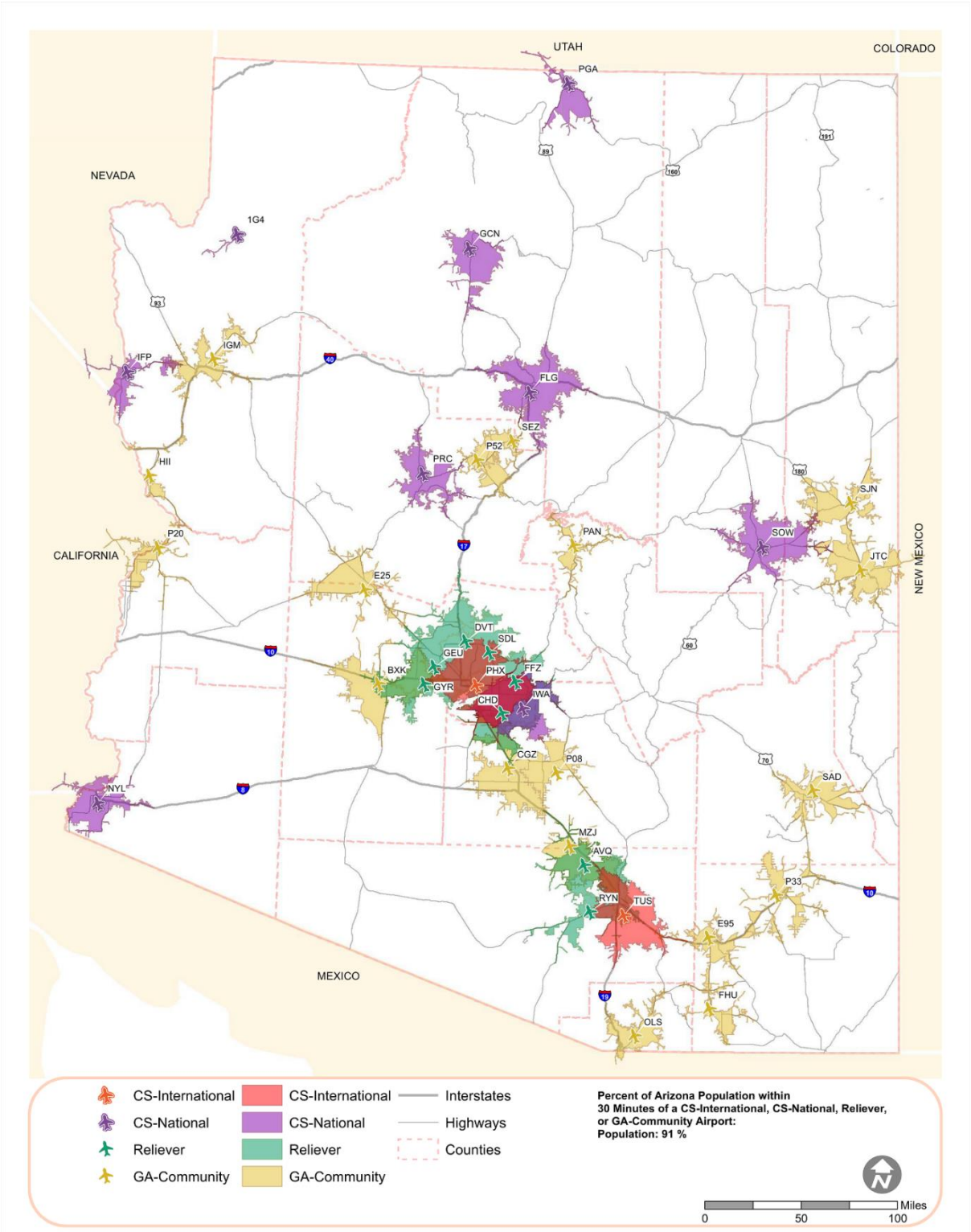
Figure 28. 30-Minute Drive Times of Commercial Service-International and Commercial Service-National Airports[14]

[14] Population coverage drops to 62 percent when IFP is excluded from the evaluation.



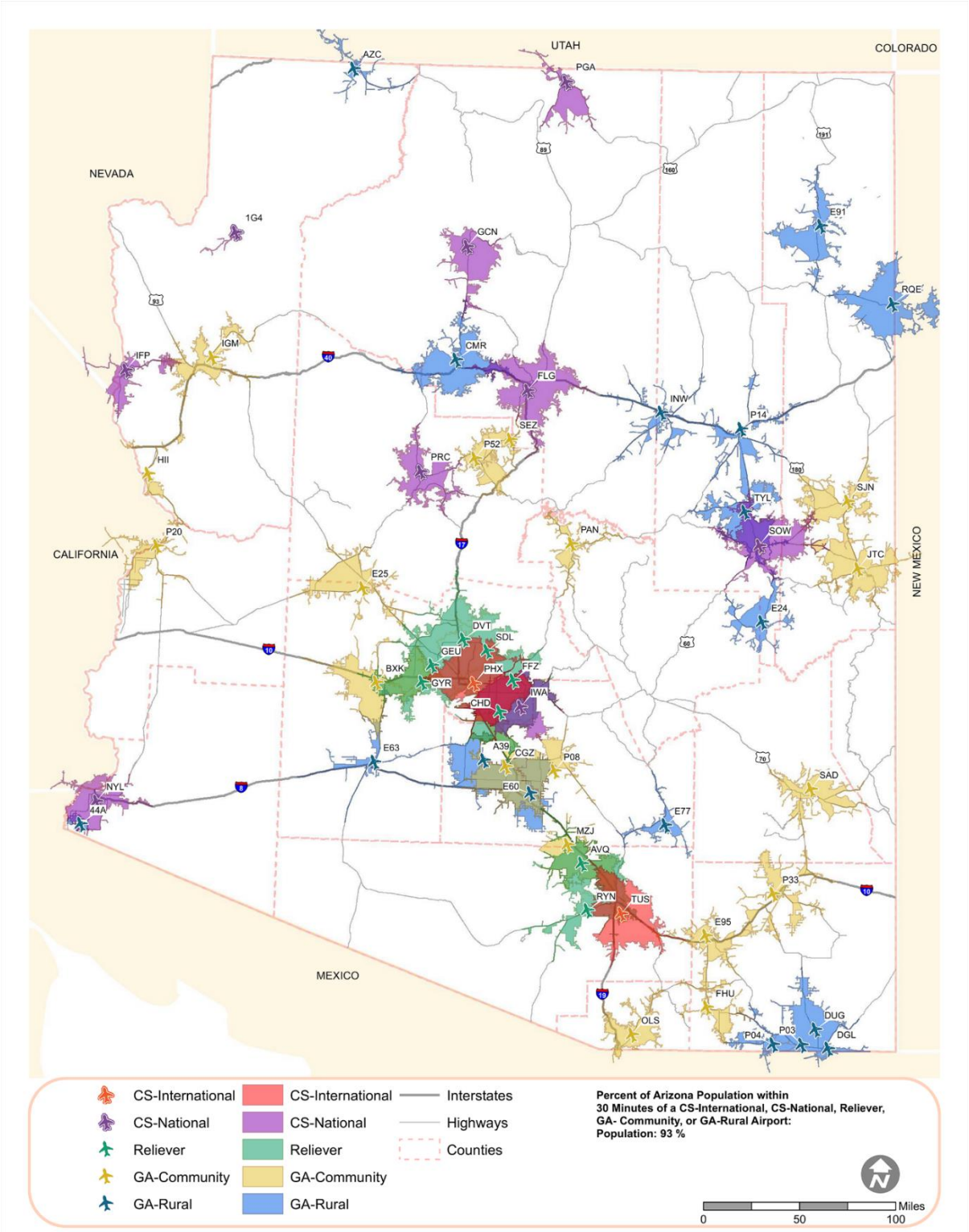
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 29. 30-Minute Drive Times of Commercial Service-International, Commercial Service-National, and Reliever Airports



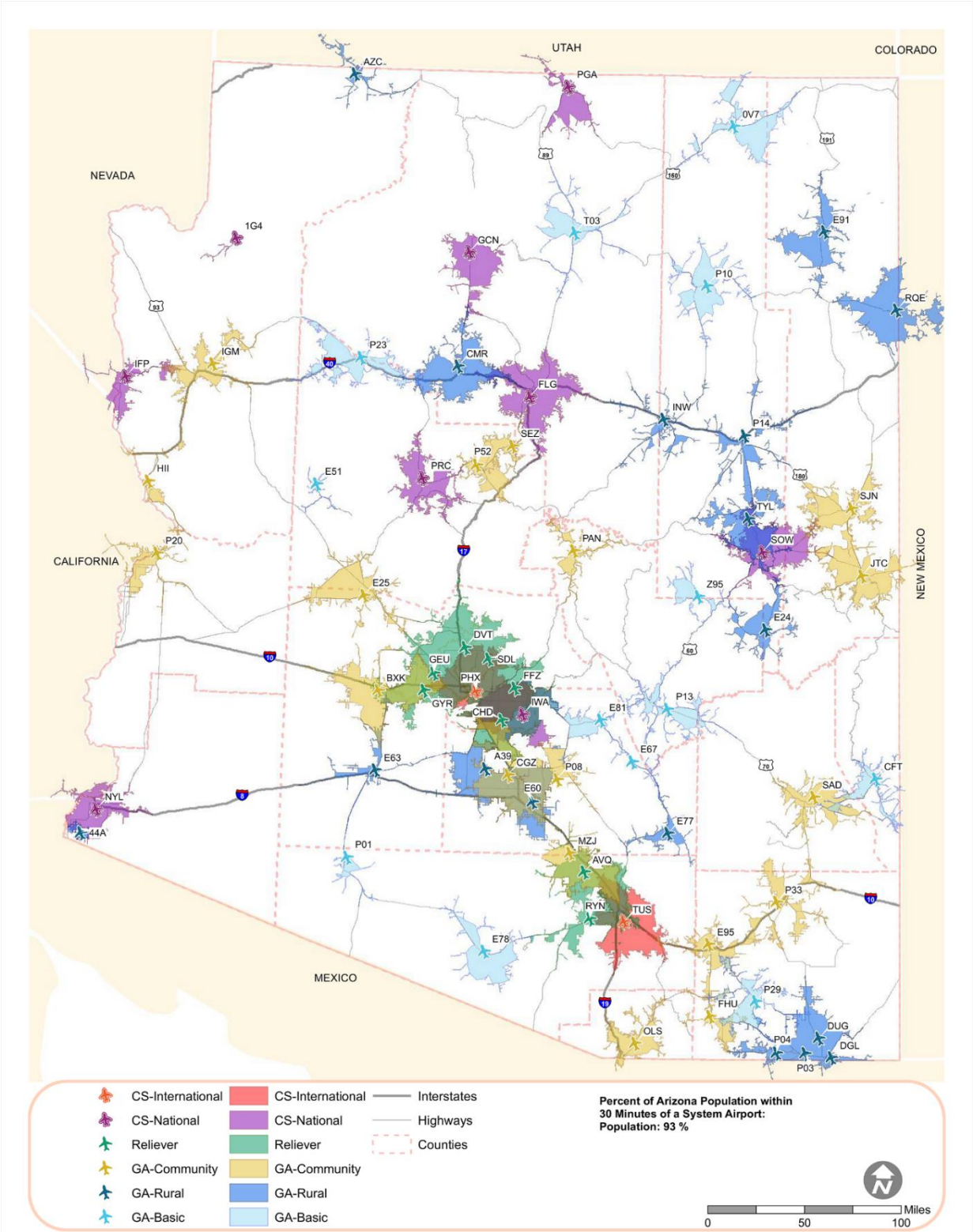
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 30. 30-Minute Drive Times of Commercial Service-International, Commercial Service-National, Reliever, and GA-Community Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 31. 30-Minute Drive Times of Commercial Service-International, Commercial Service-National, Reliver, GA-Community, and GA-Rural Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 32. 30-Minute Drive Times of all SASP Airports

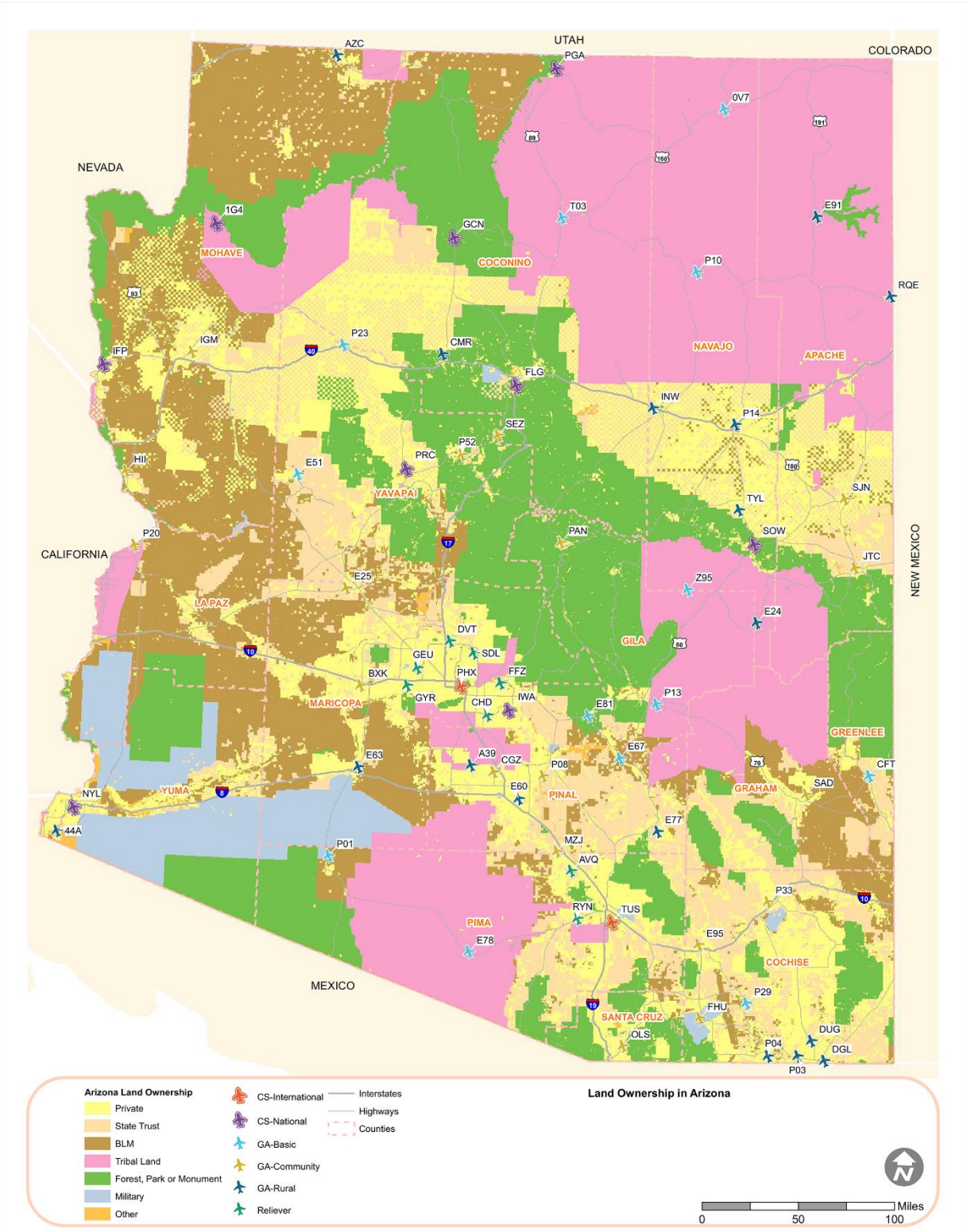
As noted previously, much of Arizona's population is within concentrated pockets throughout the state. **Table 5**, ordered by largest to smallest percentage of state ownership, presents the different types of land ownership categories with an associated percentage of state total.

Table 5. Land Ownership Types and Percentage of State Total

Land Ownership	Percent of State
Tribal Land	27.60%
Forest, Park, or Monument	21.40%
Private	17.55%
Bureau of Land Management (BLM)	16.68%
State Trust	12.68%
Military	3.77%
Other	0.32%
Total	100%

Source: Arizona Land Resource Information System (ALRIS) 2012

Figure 33 depicts the types of land ownership types in relation to the system airports.



Sources: Kimley-Horn 2018, ALRIS 2012

Figure 33. Land Ownership in Arizona

As mentioned previously, there are 11 commercial service airports in Arizona's system. Access to an airport with commercial service is critical to not only businesses and traveling Arizona residents, but visitors who impact Arizona's sizeable tourism market. The following two figures, **Figure 34** and **Figure 35**, present communities in Arizona with a population of 5,000 or greater, within a 60-minute drive time and 90-minute drive time of a commercial service airport, respectively.

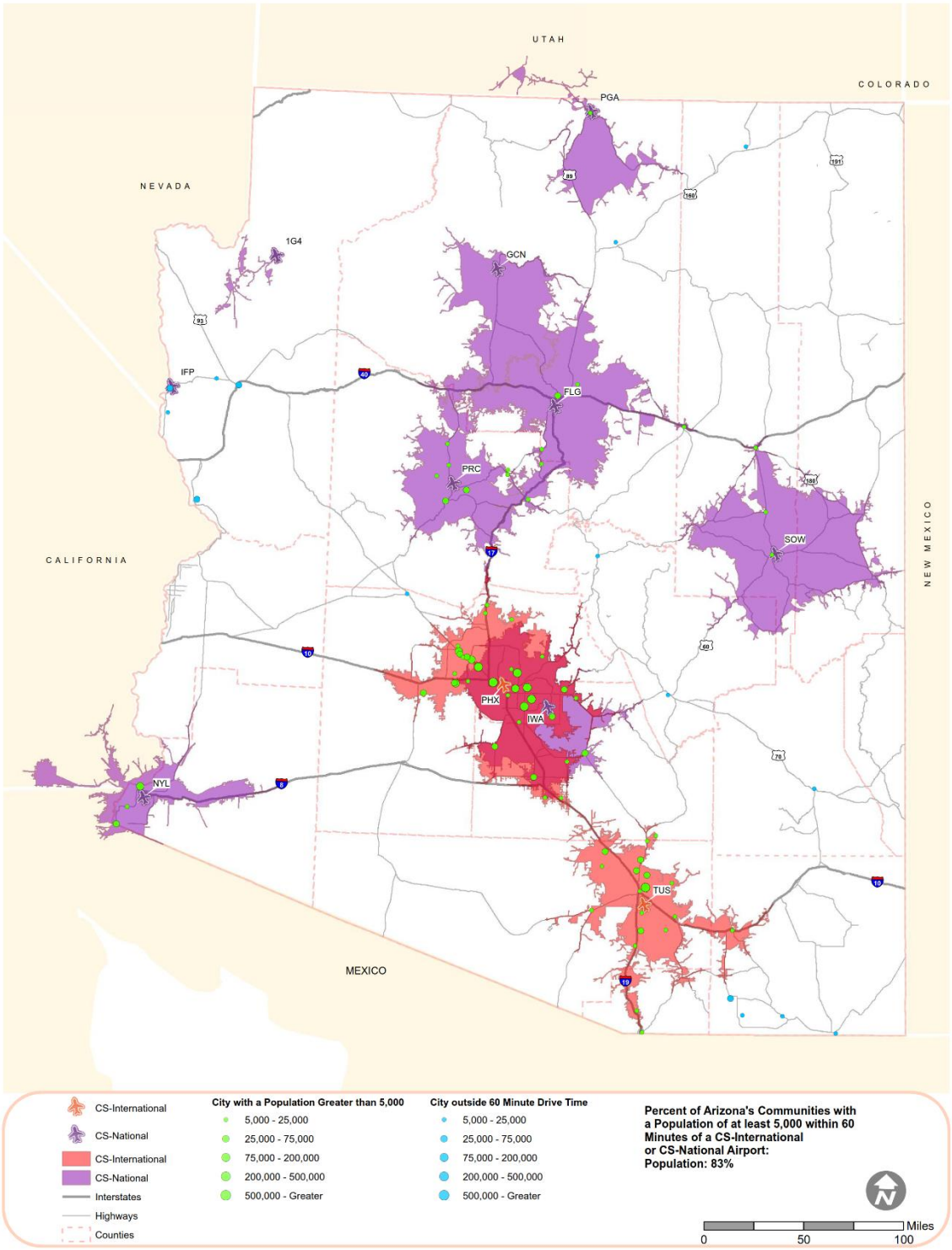
Currently, 83 percent of communities (73 of 88) with a population of 5,000 or greater are within a **60-minute** drive time of a commercial service airport. The communities with a population of 5,000 or greater that are located outside these areas include:[15]

1. Bisbee
2. Bullhead City*
3. Douglas
4. Fort Mohave*
5. Globe
6. Golden Valley*
7. Kayenta
8. Kingman*
9. Lake Havasu City
10. Payson
11. Safford
12. Sierra Vista
13. Sierra Vista Southeast
14. Tuba City
15. Wickenburg

Ninety percent of communities (79 of 88) with a population of 5,000 or greater are within a **90-minute** drive time of a commercial service airport. The communities with a population of 5,000 or greater that are located outside these areas include:[16]

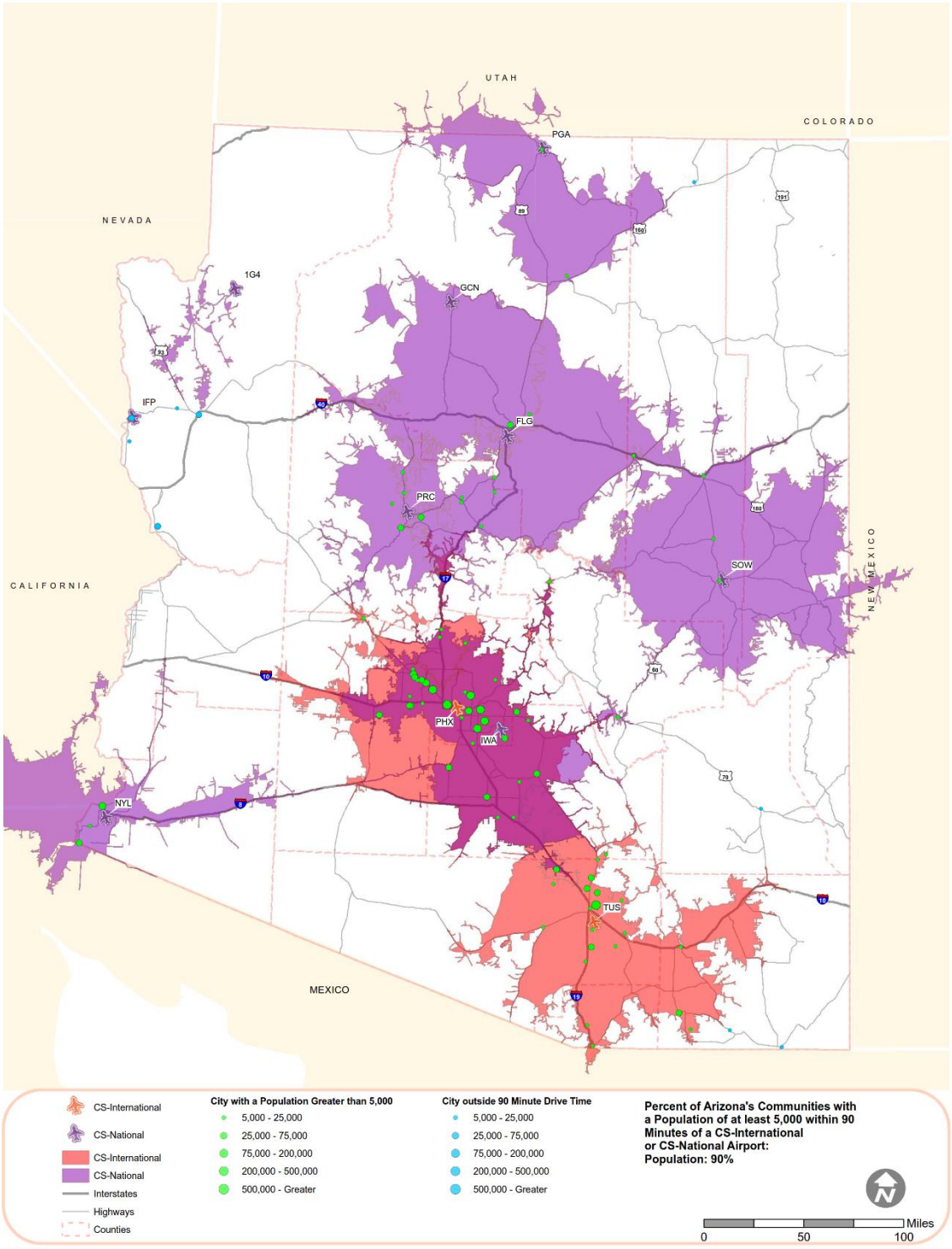
1. Bisbee
2. Bullhead City**
3. Douglas
4. Fort Mohave**
5. Golden Valley**
6. Kayenta
7. Kingman**
8. Lake Havasu City**
9. Safford

[15] *Cities with a population of at least 5,000 that would be within a 60-minute drive time of IFP if the airport was to gain publicly accessible commercial service in the future. Community coverage would increase from 83 percent to 88 percent.
[16] **Cities with a population of at least 5,000 that would be within a 90-minute drive time of IFP if the airport was to gain publicly accessible commercial service in the future. Community coverage would increase from 90 percent to 95 percent.



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 34. 60-Minute Drive Times of a Commercial Service Airport

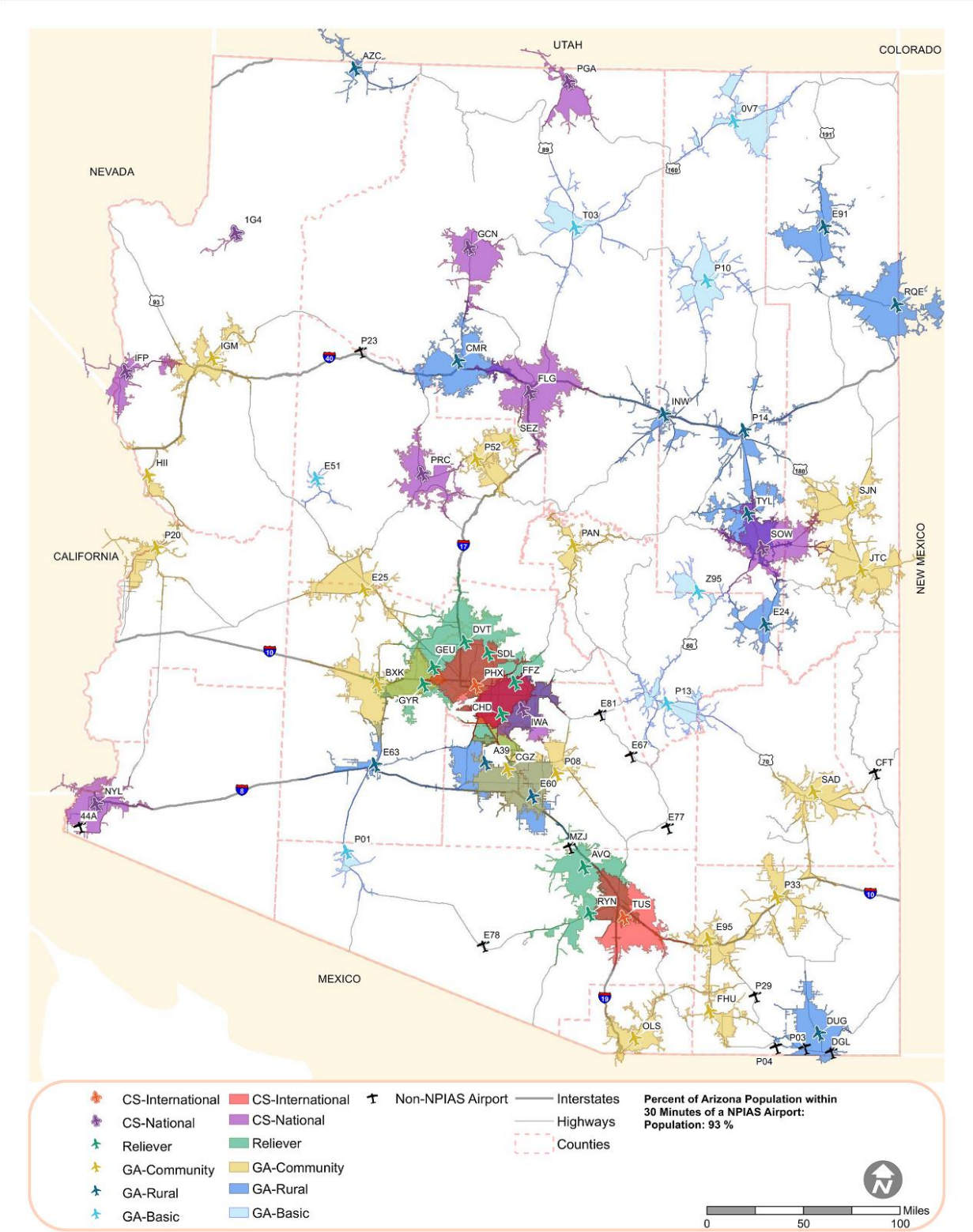


Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 35. 90-Minute Drive Times of a Commercial Service Airport

Percent of Population Within 30 Minutes of a NPIAS Airport

The NPIAS is the FAA's primary planning document that categorizes and groups airports that are deemed significant to the national airspace system and thus eligible for Airport Improvement Program (AIP) funding. The NPIAS categorizes commercial service airports by their hub size and GA airports by ASSET category. Hub sizes include large, medium, small, and nonhub airports, while ASSET categories include national, regional, local, and basic. Arizona is home to 59 NPIAS airports, including one large hub commercial service airport (PHX) and two national ASSET airports (Phoenix-Deer Valley [DVT] and Scottsdale [SDL]). **Figure 36** shows a total population coverage of 93 percent within 30 minutes of the state's 59 NPIAS airports.

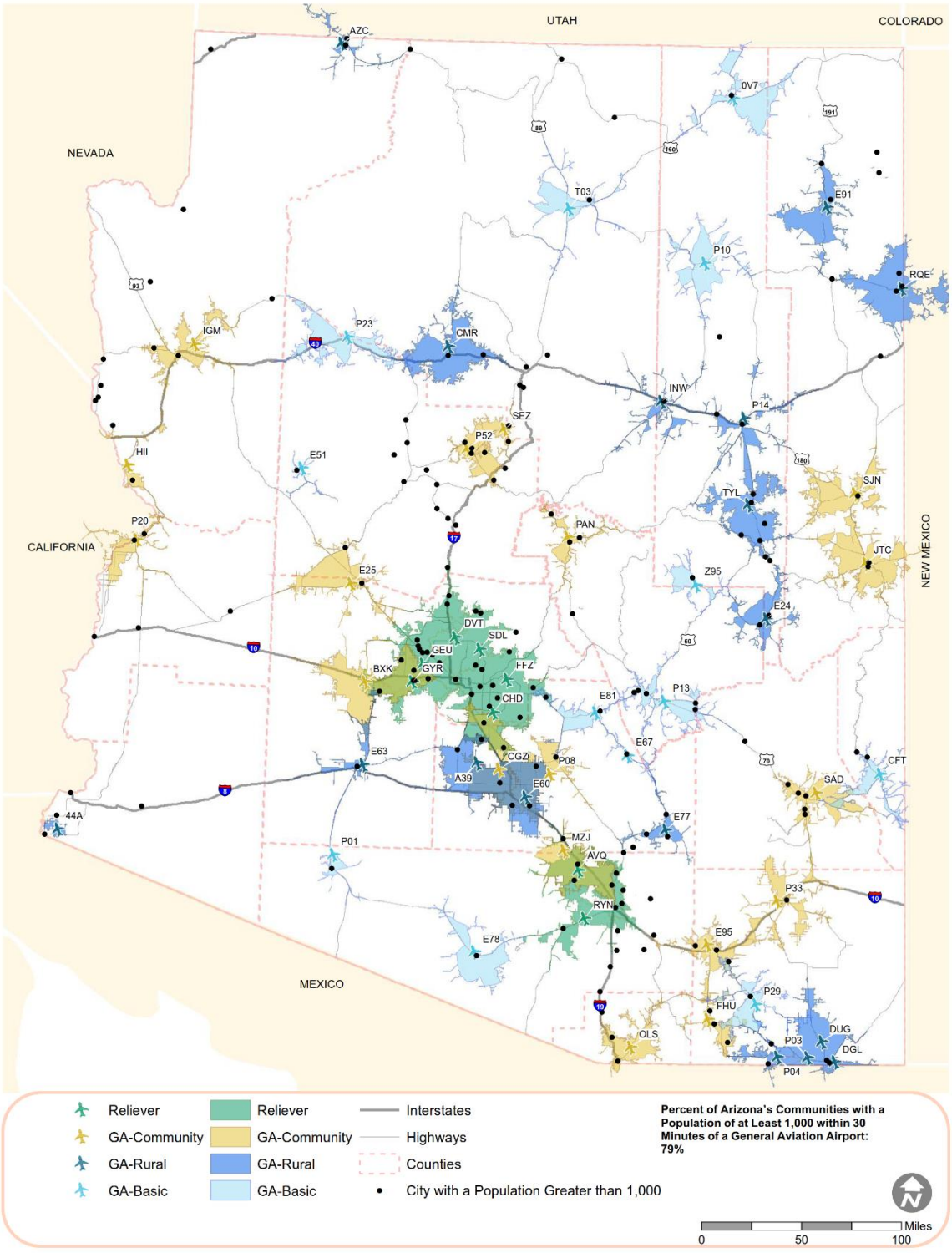


Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 36. 30-Minute Drive Times of NPIAS Airports in Arizona

Percent of Communities in the State with a Population Greater than 1,000 with a 30-Minute Drive Time of a GA Airport

Reasonable access to GA airports is a fundamental feature of an adequate state aviation system. The GA portion of airports in Arizona's system indicates the magnitude of aviation activity that is occurring outside of the state's 11 commercial service airports. Providing access for communities to these GA airports helps promote their continued use and support of medical transport, cargo, and other aviation activities for communities across the state. As shown in **Figure 37**, 79 percent of these communities are located within a 30-minute drive time of a GA airport.

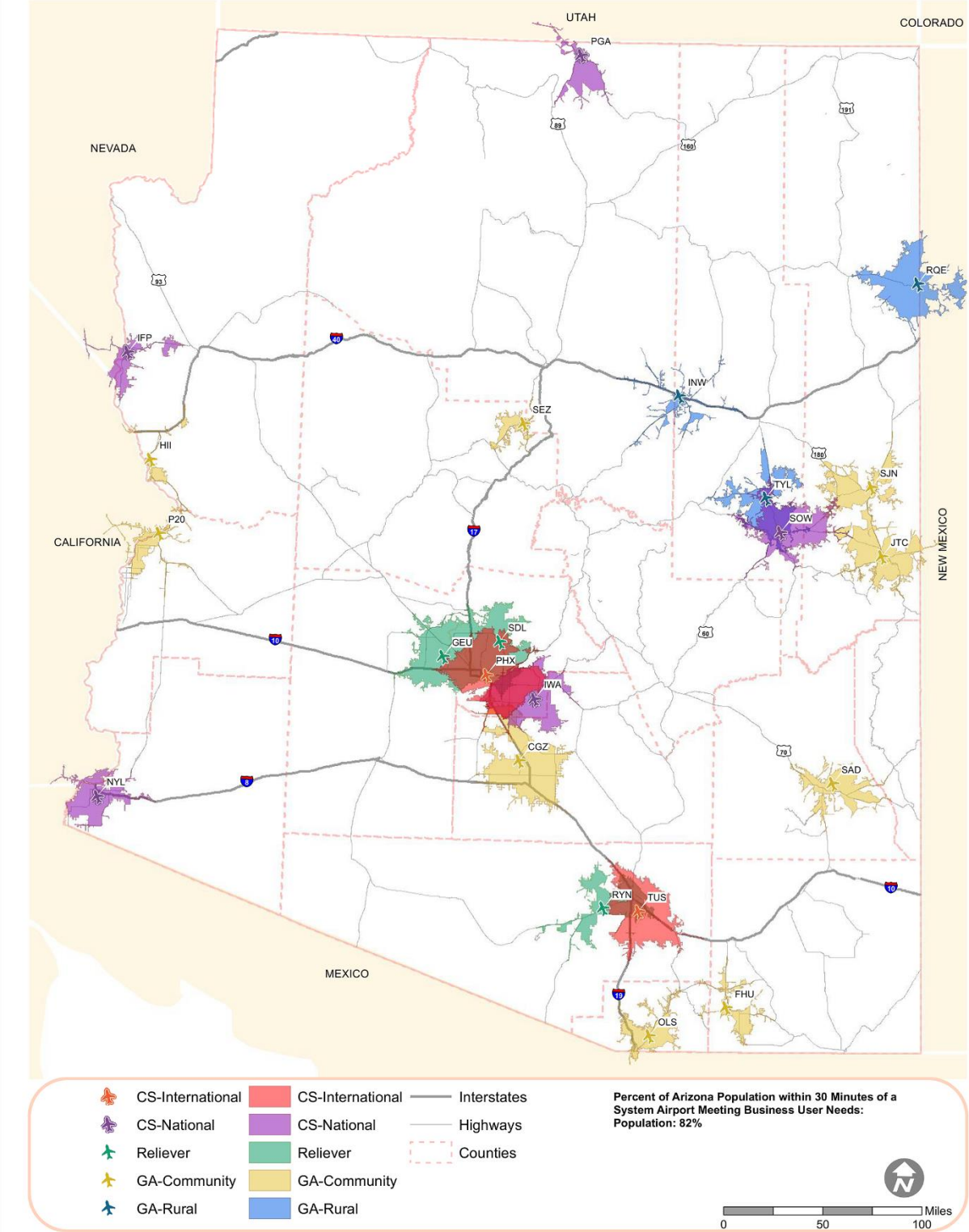


Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 37. Communities in the State with a Population Greater than 1,000 within a 30-Minute Drive Time of a GA Airport

Percent of Population Within 30 Minutes of a System Airport Meeting Business User Needs

The presence of an airport that supports business and corporate aviation is an important indicator of the health of the local or regional economy. Not only does business aviation support good, well-paying jobs, but airports that serve this type of activity provide access to communities, many of which are not served by scheduled airlines. As a result, airports that support business/corporate aviation can have significant direct and indirect impacts on local economies. This analysis included the most important attributes needed to support a typical business jet, including at least a 5,000-foot-long runway, weather reporting station (i.e., AWOS or ASOS), IAP, and jet fuel. As shown in **Figure 38**, 82 percent of the state's population is within a 30-minute drive time of airports meeting the criteria to serve business user needs.



Sources: Airport Inventory and Data Survey 2017, AirNav 2017, CDM Smith 2017, Kimley-Horn 2018

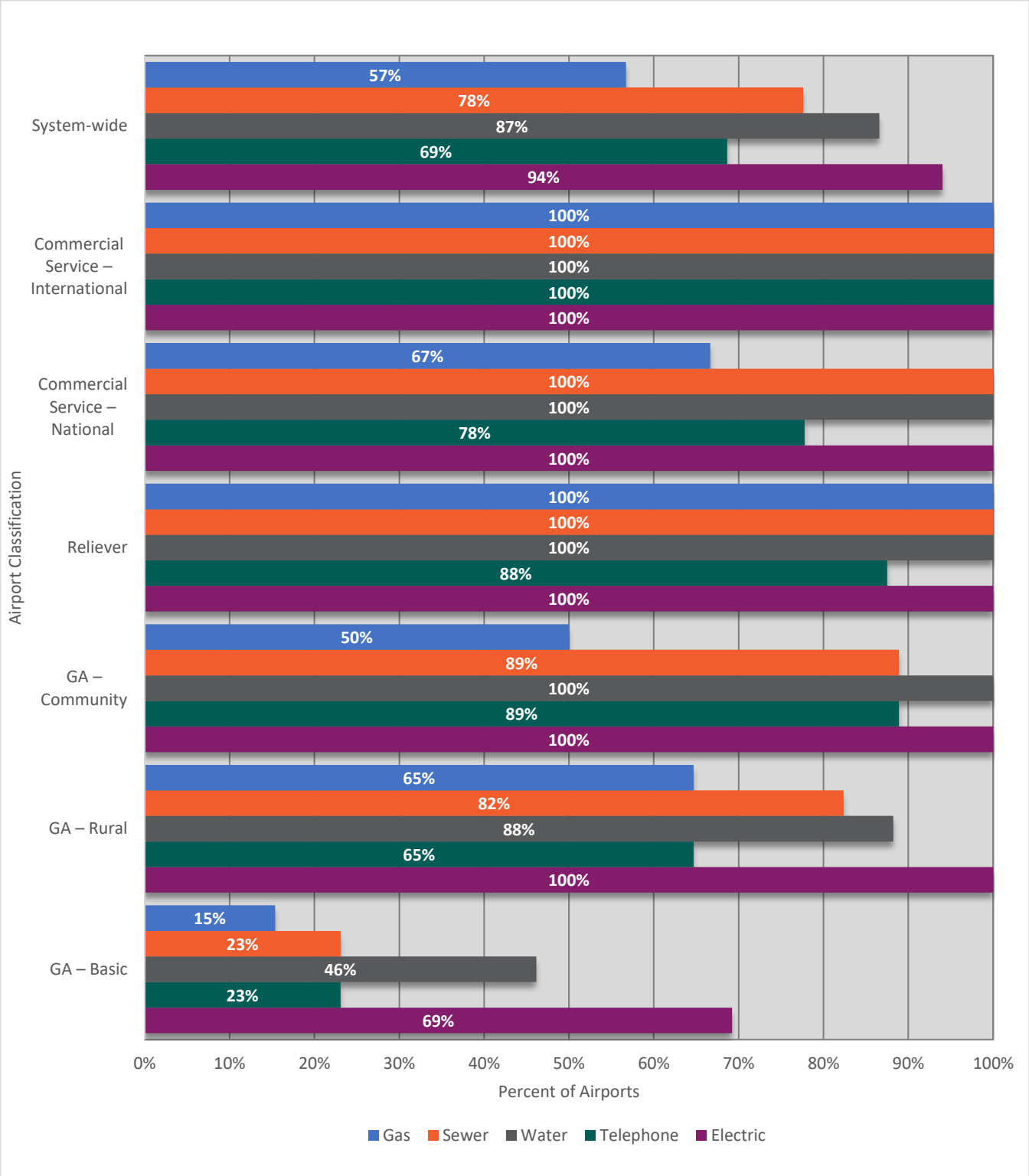
Figure 38. 30-Minute Drive Times of System Airports Meeting Business User Needs

Number of Airports with Utilities (i.e., Electricity, Telephone, Water, Sewer, and Gas)

Adequate utilities provide a number of important benefits for both commercial service and GA airports. In addition to providing for passenger comfort and convenience at commercial service airports, utilities support safety and security at all types of airports. Water, for example, is required for fire suppression systems at commercial service and GA airports. Power is essential for security procedures of the Transportation Security Administration (TSA). Utilities, including electricity, water, and sewer, are also vital for many airport tenants, which may provide the only source of revenue at GA airports. They can also be a determining factor in where aircraft owners choose to base their aircraft. Phone service can be important for pilots landing at rural airports without reliable cell service.

Airports were asked about the availability of electricity, telephone, water, sewer, and gas during the airport inventory.[17] State-wide, 57 percent of airports reported having gas, 78 percent sewer, 87 percent water, 69 percent telephone, and 94 percent electricity. **Figure 39** presents results based on airport classification as well as system-wide totals.

[17] This analysis was limited to those utilities explicitly noted on the Airport Inventory and Data Survey. In some cases, airports reported that their facilities were served by septic system. Septic systems were excluded from the analysis for consistency purposes.



Source: Airport Inventory and Data Survey 2017

Figure 39. Percent of Airports by Classification with Utilities

GOAL CATEGORY: ECONOMIC SUPPORT

Airports play an important role in promoting economic activity in Arizona and provide a critical competitive advantage in today's global marketplace. Airports are the keystone to the multibillion dollar air cargo industry and are gateways between markets in Arizona and across the globe. The 2012 *Economic Impact of Aviation in Arizona* report found that the aviation industry accounts for 16.8 percent of all jobs and generates a significant source of tax revenues in the state. Additionally, the majority of visitors to Arizona arrive through commercial service and GA airports (versus travel by car, bus, or train). Businesses in Arizona and across the U.S. regularly report that the presence of an airport network is a critical factor in their relocation and expansion decisions. Based on the significant economic impacts provided by the aviation industry, investing in Arizona's airports can provide a significant return on investment for Arizona's residents and businesses.

Performance Measures

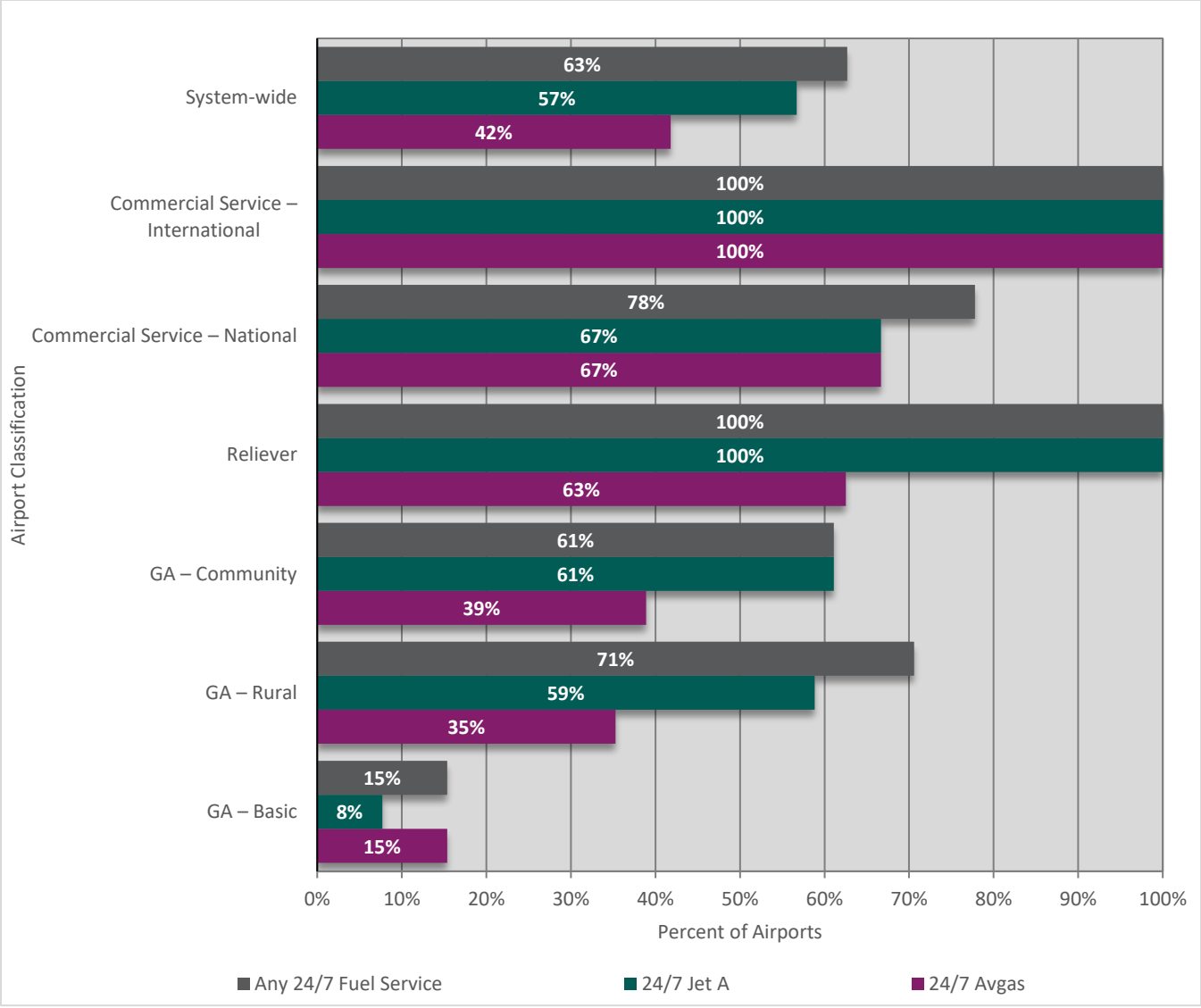
The analyses of performance measures associated with the economic support goal category are presented below. These performance measures include:

1. Percent of airports with 24/7 fuel
2. Percent of airports that are recognized in local/regional growth plans
3. Percent of airports with the facilities to support jet aircraft

Percent of Airports with 24/7 Fuel

The widespread availability of fuel is an important driver of the level of aviation activity found in Arizona. Access to fuel 24 hours per day, seven days per week allows aircraft to fly at non-peak hours and adds a layer of safety for pilots in emergency situations when aircraft require immediate re-fueling. The benefits of 24/7 fuel also extend to community safety and resiliency, as aircraft can re-fuel during times of disaster when they are needed to transport people, goods, and services. Additionally, 24/7 fuel helps attract both based and transient aircraft operators who need quick access to fuel on-demand.

Airports were asked about the availability of fuel during the airport inventory. This assessment included airports that provide AvGas (used by piston-powered engines in many GA aircraft), Jet A (used by the turbine engines in jet aircraft), or both. Fuel could be distributed via a self-serve pump or a 24-hour fixed-base operator (FBO) service. **Figure 40** summarizes the percentage of airports by classification that offer 24/7 fueling as reported during the airport inventory. In total, 63 percent of the system reported offering some form of 24/7 fueling, including all airports in the Commercial Service-International and Reliever classifications. Individually, 57 percent of the system reported offering 24/7 jet fuel, while 42 percent reported offering 24/7 AvGas (albeit not the exact same set of airports).



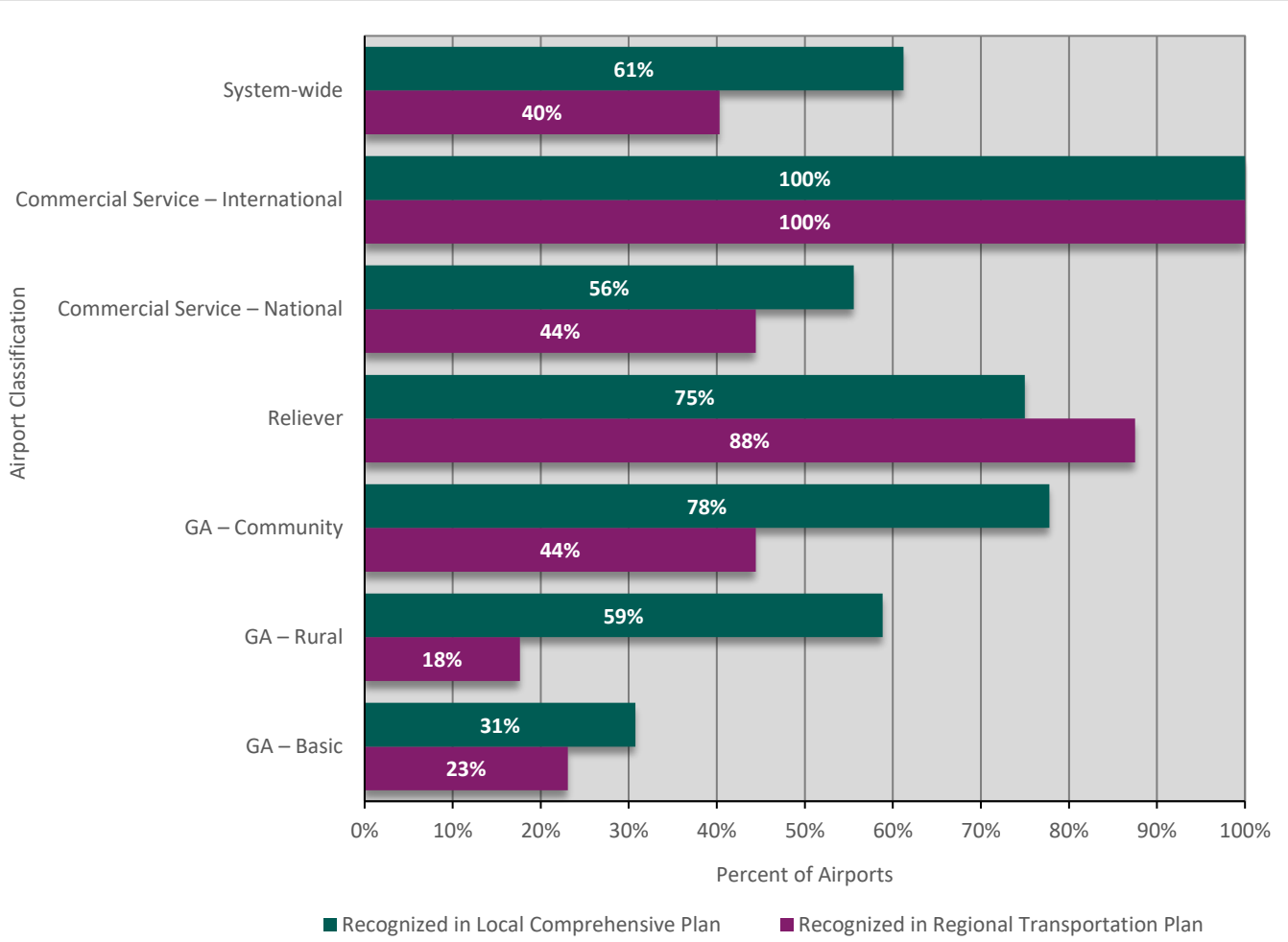
Source: Airport Inventory and Data Survey 2017

Figure 40. Percent of Airports by Classification with 24/7 Fuel Service

Percent of Airports that are Recognized in Local/Regional Growth Plans

An airport's inclusion in local or regional growth plans indicates community support by recognizing the facility's role in future growth and economic development, as well as applicable multimodal transportation goals. Being recognized in local or regional plans is a sign of stability within an airport's community. Airports that are included in these types of plans are also typically more likely to be located in areas with controls or zoning designed to promote airport compatible land uses, which increase the airport's long-term viability and potential (see discussion on page 6-6-5 for further details about airport compatible land use).

Airports were asked if they are recognized in local/regional growth plans during the airport inventory. **Figure 41** summarizes the percentage of airports by classification that are recognized in their local comprehensive plan or regional transportation plan as reported. In total, 61 percent of Arizona's system airports are recognized in their local comprehensive plan, including both Commercial Service-International airports, 78 percent of GA-Community airports, and 75 percent of Reliever airports. Forty percent of total system airports are included in their regional transportation plan, including 100 percent of Commercial Service-International airports and 88 percent of Reliever airports.



Source: Airport Inventory and Data Survey 2017

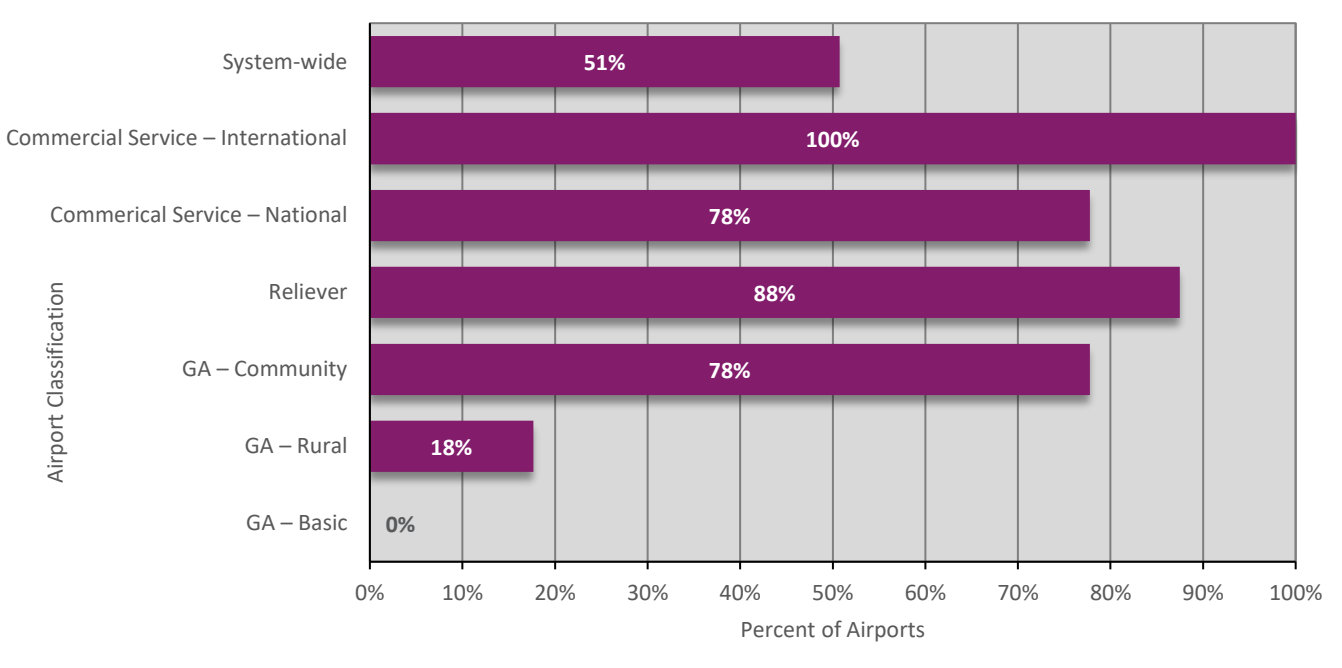
Figure 41. Percent of Airports by Classification Recognized in Local or Regional Growth Plans

Percent of Airports with the Facilities to Support Jet Aircraft

The ability to support jet aircraft is important for airports hoping to attract and support more demanding aviation activity such as corporate flights and air cargo. Similar to supporting business activity, for the purposes of the SASP Update, airports are seen as having the facilities to support jet aircraft if they have the following:

1. Paved runway at least 5,000 feet in length
2. Published IAP
3. Conventional hangar space
4. Jet A fuel

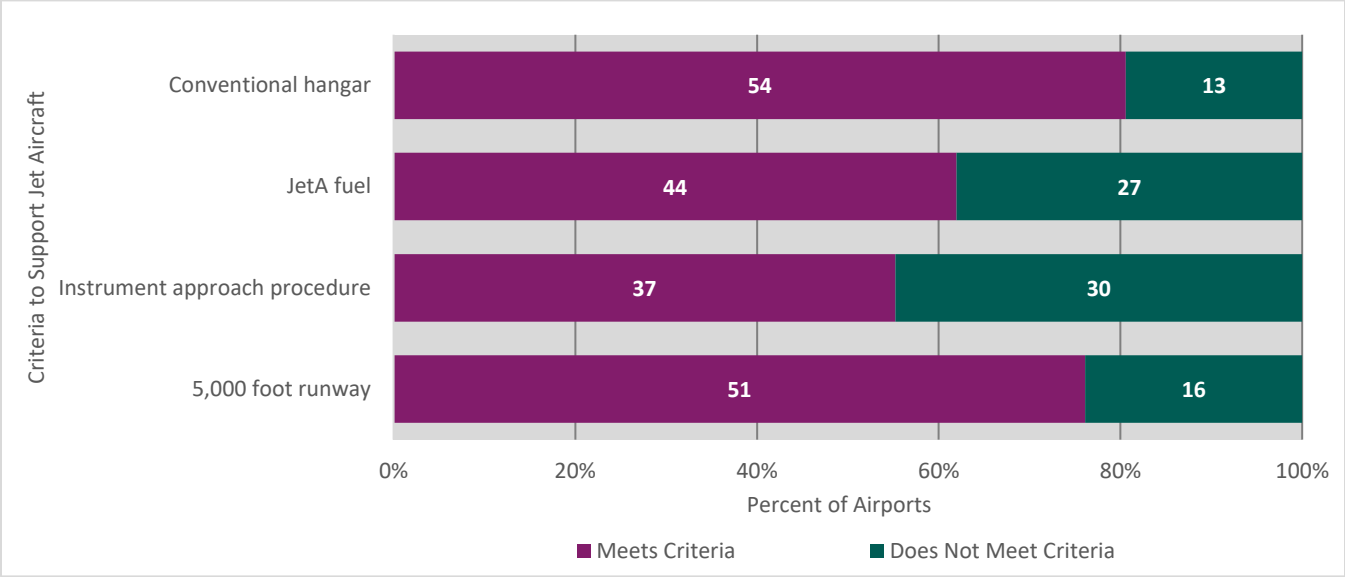
During the airport inventory, airports confirmed the length of their runway and provided information about the type and availability of hangar space and fuel. Data regarding IAPs were obtained from SkyVector. **Figure 42** summarizes the percentage of airports by classification that meet these criteria. In total, 51 percent of system airports have the above facilities, optimizing their ability to support jet aircraft. This includes both Commercial Service-International airports, 78 percent of Commercial Service-National airports, and 88 percent of Reliever airports.



Sources: Airport Inventory and Data Survey 2017, SkyVector 2017

Figure 42. Percentage of Airports by Classification with the Facilities to Support Jet Aircraft

Figure 43 summarizes airports' abilities to achieve each of the individual criterion used to assess this performance measure. Of those airports that do not meet the criteria to support jet aircraft, most are missing an IAP (30 airports missing this component), followed by Jet A fuel (27 airports), 5,000-foot runway (16 airports), and conventional hangars (13 airports).



Source: Airport Inventory and Data Survey 2017

Figure 43. Number of Airports that Meet/Do Not Meet Criterion to Support Jet Aircraft

System Indicators

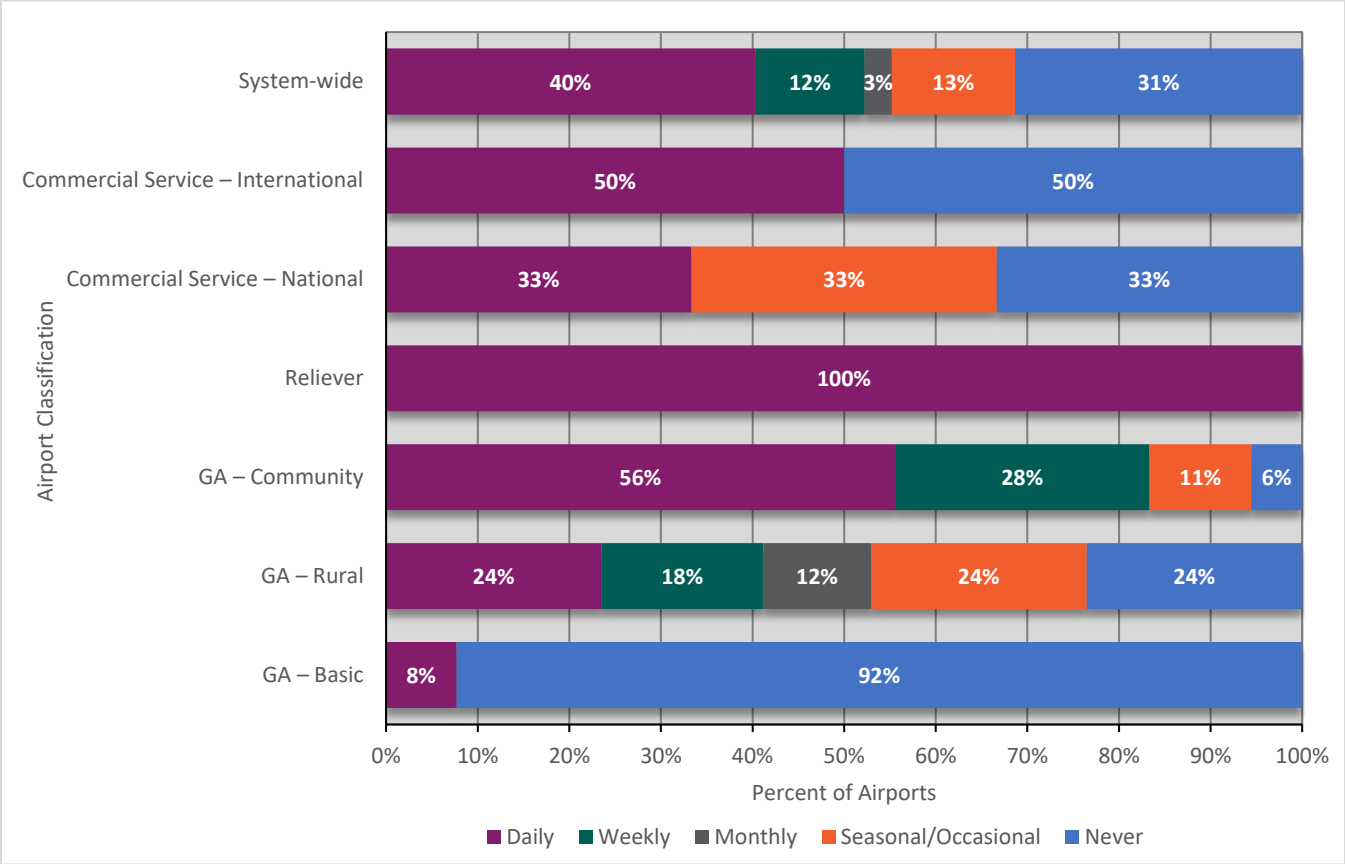
This section discusses results of the evaluation of system indicators associated with the economic support goal category. System indicators include:

1. Percent of system airports supporting flight training
2. Dollars of direct and indirect economic impact in the state from aviation

Percent of System Airports Supporting Flight Training

Flight training is one of the most significant components of the aviation industry in the state. In fact, Arizona has the fourth highest number of flight instructors in the country and the second highest number of flight instructors per capita. The state's ideal flying conditions draw student pilots from around the globe, and numerous countries send current or future military pilots to the state for flight instruction and/or specialized training. Perhaps most importantly, the growing international pilot shortage underscores Arizona's role in the long-term health of the aviation industry. Flight schools also act as marketers of aviation, hosting events and providing free flights to those interested in aviation. Flight training based at an airport is also an important source of revenue and may help to attract transient activity and other businesses. Flight schools often purchase fuel from an airport's FBO to expand their economic impact to the airport and surrounding area.

During the inventory effort, Arizona airports were asked to report the frequency with which they experience flight training activities. These activities may be based (i.e., the flight school is located on the airport itself) or transient (such as touch-and-go operations). **Figure 44** summarizes this reported data by role. In total, 69 percent of the system reported experiencing flight training activities at least occasionally, with 40 percent of system airports reporting that they experience flight training on a daily basis.



Source: Airport Inventory and Data Survey 2017

Figure 44. Percentage of Airports by Classification Experiencing Flight Training Operations

Dollars of Direct and Indirect Economic Impact in the State from Aviation

The economic impact of an airport is a measure of the fiscal contribution of airport operations and its users to the surrounding region and the state. Air transport and tourism, commercial aviation, GA, and aerospace manufacturing all contribute to the state and local economies. To gauge the economic impact of SASP airports, data was used from the statewide aviation economic impact study, *The Economic Impact of Aviation in Arizona 2012*, conducted by Elliott D. Pollack & Company for ADOT. Additional information about this study is available in **Chapter 5: Airport Classification Analysis**.

Primary economic impacts are the statewide economic activities, employment, and payroll that can be attributed directly and indirectly to the operation of system airports. They help describe the importance of aviation as an industry. Direct impacts are the consequences of on-airport economic activities carried out by airlines, airport management, FBOs, and other aviation-dependent industries. Direct impacts represent

economic activities that would not have occurred in the absence of an airport system. Indirect impacts are additional off-site economic activities that occur in response to investments in the airport system. Existing firms expand their economic activity to meet the additional demand for services that results from the airport. These activities include services provided by travel agencies, hotels, restaurants, and retail establishments.

Table 6 details direct and indirect economic impacts at Arizona airports as reported in *The Economic Impact of Aviation in Arizona 2012*. For the airports analyzed in the study, there was a total direct annual economic impact of over $12.1 billion and indirect economic impact of over $19.8 billion. The average direct economic impact of these airports was nearly $259 million, while the average indirect economic impact was nearly $422 million. However, these average impact numbers were heavily skewed by the state's commercial service airports.

Table 6. Direct and Indirect Economic Impact of Arizona Airports

Associated City	Airport Name	FAA ID	Direct Economic Impact	Indirect Economic Impact
Commercial Service-International				
Phoenix	Phoenix Sky Harbor International	PHX	$9,551,000,000	$9,435,000,000
Tucson	Tucson International	TUS	$1,732,000,000	$9,710,000,000
	Commercial Service-International Total		**$11,283,000,000**	**$19,145,000,000**
Commercial Service-National				
Bullhead City	Laughlin/Bullhead City International	IFP	$46,813,000	$43,649,000
Flagstaff	Flagstaff Pulliam	FLG	$32,957,000	$14,962,000
Grand Canyon	Grand Canyon National Park	GCN	$25,356,000	$16,073,000
Page	Page Municipal	PGA	$14,274,000	$7,478,000
Peach Springs	Grand Canyon West	1G4	Not in EIS	Not in EIS
Phoenix	Phoenix-Mesa Gateway	IWA	$309,553,000	$247,186,000
Prescott	Ernest A. Love Field	PRC	$21,527,000	$10,959,000
Show Low	Show Low Regional	SOW	$14,625,000	$4,872,000
Yuma	Yuma International	NYL	$55,808,000	$24,540,000
	Commercial Service-National Total		**$520,913,000**	**$369,719,000**
Reliever				
Chandler	Chandler Municipal	CHD	$10,235,000	$9,858,000
Glendale	Glendale Municipal	GEU	$16,837,000	$17,293,000
Goodyear	Phoenix Goodyear	GYR	$71,193,000	$67,417,000
Marana	Marana Regional	AVQ	$7,888,000	$5,764,000
Mesa	Falcon Field	FFZ	$35,544,000	$36,491,000
Phoenix	Phoenix Deer Valley	DVT	$62,261,000	$55,721,000
Scottsdale	Scottsdale	SDL	$61,929,000	$54,970,000
Tucson	Ryan Field	RYN	$26,381,000	$20,764,000
	Reliever Total		**$292,268,000**	**$268,278,000**
GA-Community				
Benson	Benson Municipal	E95	$1,127,000	$537,000
Buckeye	Buckeye Municipal	BXK	$141,000	$1,140,000
Casa Grande	Casa Grande Municipal	CGZ	$2,112,000	$587,000
Coolidge	Coolidge Municipal	P08	$2,697,000	$962,000
Cottonwood	Cottonwood Municipal	P52	$516,000	$286,000
Kingman	Kingman	IGM	$16,984,000	$16,491,000

Associated City	Airport Name	FAA ID	Direct Economic Impact	Indirect Economic Impact
Lake Havasu City	Lake Havasu City	HII	$6,281,000	$5,692,000
Marana	Pinal Airpark	MZJ	Not in EIS	Not in EIS
Nogales	Nogales	OLS	$1,337,000	$508,000
Parker	Avi Suquilla	P20	$1,441,000	$586,000
Payson	Payson	PAN	$2,850,000	$1,051,000
Safford	Safford Regional	SAD	$1,939,000	$720,000
Sedona	Sedona	SEZ	$5,249,000	$2,489,000
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	$5,683,000	$2,240,000
Springerville	Springerville Municipal	JTC	$4,051,000	$1,020,000
St. Johns	St. Johns Industrial Air Park	SJN	$1,826,000	$441,000
Wickenburg	Wickenburg Municipal	E25	$396,000	$393,000
Willcox	Cochise County	P33	$912,000	$342,000
	GA-Community Total		**$55,542,000**	**$35,485,000**
	GA-Rural			
Bisbee	Bisbee Municipal	P04	$1,055,000	$426,000
Chinle	Chinle Municipal	E91	Not in EIS	Not in EIS
Colorado City	Colorado City Municipal	AZC	$2,670,000	$2,471,000
Douglas	Bisbee-Douglas International	DUG	$406,000	$170,000
Douglas	Cochise College	P03	$3,111,000	$1,164,000
Douglas	Douglas Municipal	DGL	$5,606,000	$2,604,000
Eloy	Eloy Municipal	E60	$0	$0
Gila Bend	Gila Bend Municipal	E63	$822,000	$771,000
Holbrook	Holbrook Municipal	P14	$422,000	$122,000
Maricopa	Ak-Chin Regional	A39	Not in EIS	Not in EIS
San Luis	Rolle Airfield	44A	Not in EIS	Not in EIS
San Manuel	San Manuel	E77	Not in EIS	Not in EIS
Taylor	Taylor	TYL	$258,000	$75,000
Whiteriver	Whiteriver	E24	Not in EIS	Not in EIS
Williams	H.A. Clark Memorial Field	CMR	$176,000	$68,000
Window Rock	Window Rock	RQE	Not in EIS	Not in EIS
Winslow	Winslow-Lindbergh Regional	INW	$1,194,000	$343,000
	GA-Rural Total		**$15,720,000**	**$8,214,000**
	GA-Basic			
Ajo	Eric Marcus Municipal	P01	Not in EIS	Not in EIS
Bagdad	Bagdad	E51	Not in EIS	Not in EIS
Cibecue	Cibecue	Z95	Not in EIS	Not in EIS
Clifton	Greenlee County	CFT	Not in EIS	Not in EIS
Globe	San Carlos Apache	P13	Not in EIS	Not in EIS
Kayenta	Kayenta	0V7	Not in EIS	Not in EIS
Kearny	Kearny	E67	Not in EIS	Not in EIS
Polacca	Polacca	P10	Not in EIS	Not in EIS
Seligman	Seligman	P23	$331,000	$264,000
Sells	Sells	E78	Not in EIS	Not in EIS
Superior	Superior	E81	Not in EIS	Not in EIS

Associated City	Airport Name	FAA ID	Direct Economic Impact	Indirect Economic Impact
Tombstone	Tombstone Municipal	P29	Not in EIS	Not in EIS
Tuba City	Tuba City	T03	Not in EIS	Not in EIS
		GA-Basic Total	**$331,000**	**$264,000**
		Arizona System Total	**$12,167,774,000**	**$19,826,960,000**
		Arizona System Airport Average	**$258,888,809**	**$421,850,213**

Source: Elliott D. Pollack & Company 2013

FACILITY AND SERVICE OBJECTIVES

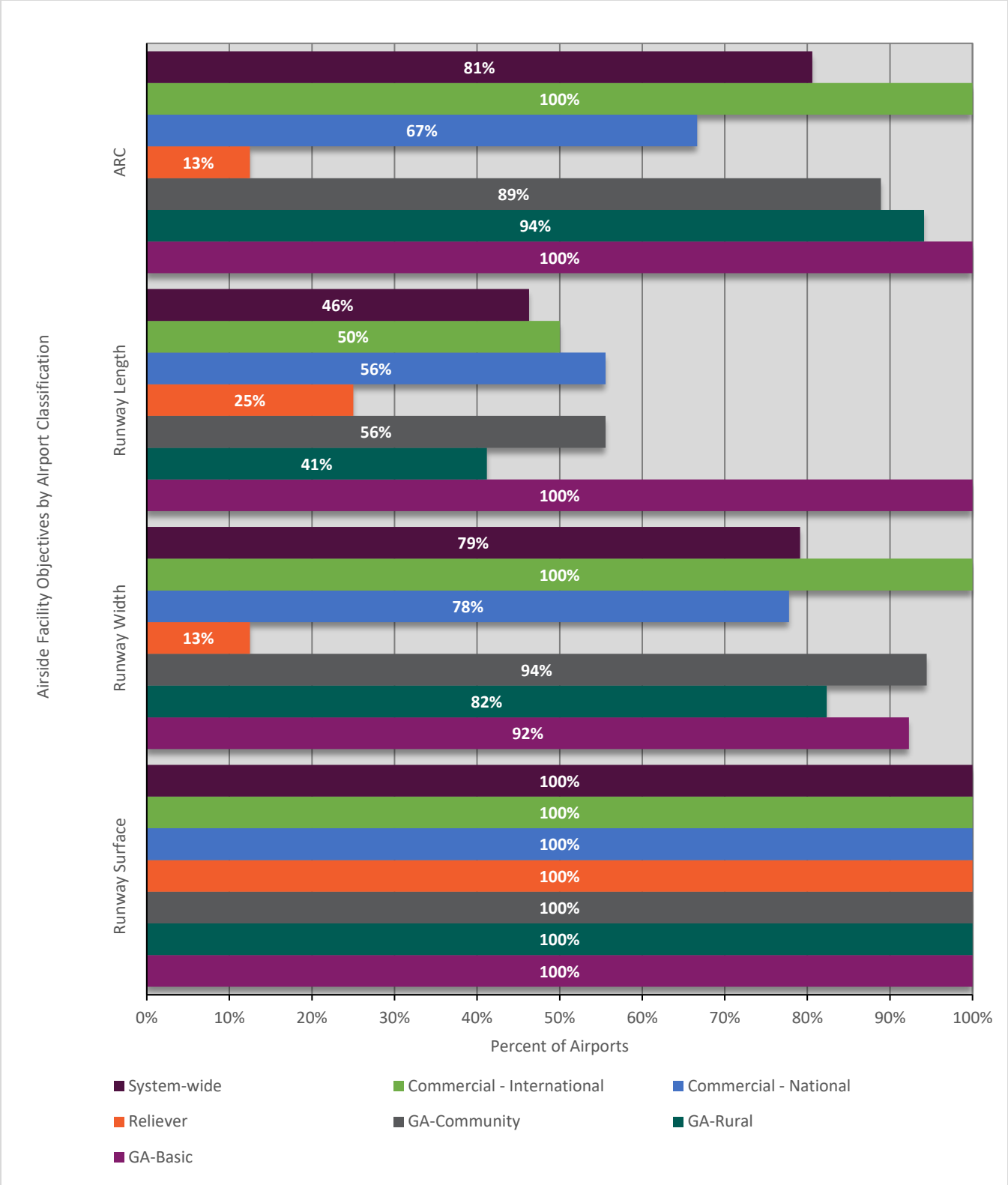
In addition to evaluating airports' current abilities to achieve the performance measures of the three goals established for the state aviation system, the SASP Update identified a series of facility and service objectives to guide development at system airports. As discussed in **Chapter 5: Airport Classification Analysis**, these objectives are designed to provide guidance on the minimum level of development that airports should strive to achieve. They are not intended to be mandates, but recommended standards to help guide airports to optimally perform their roles within the system. In general, airports that serve larger, more sophisticated aircraft and support diverse aviation activities typically require more extensive services and facilities, while smaller airports with limited aircraft operations and activities necessitate fewer.

It is important to note that the SASP Update serves as an overview of statewide aviation needs to the ADOT Aeronautics Group. An airport that is deficient in a particular objective does not necessarily indicate a project should be pursued. Instead, an airport should consider if its existing facilities and services accommodate current and anticipated needs during the master planning process. From federal (i.e., FAA) and state (i.e., ADOT) perspectives, specific projects must be justified in an airport-specific study (e.g., master plan) and included on the ALP before funding can be awarded. While the SASP Update provides the framework of statewide needs, airport-specific analyses are critical to determine the facilities and objectives appropriate for a specific airport.

Figure 45 through **Figure 51** summarize the current compliance of each airport classification with the specific facility and service objectives established for it, in the following order:

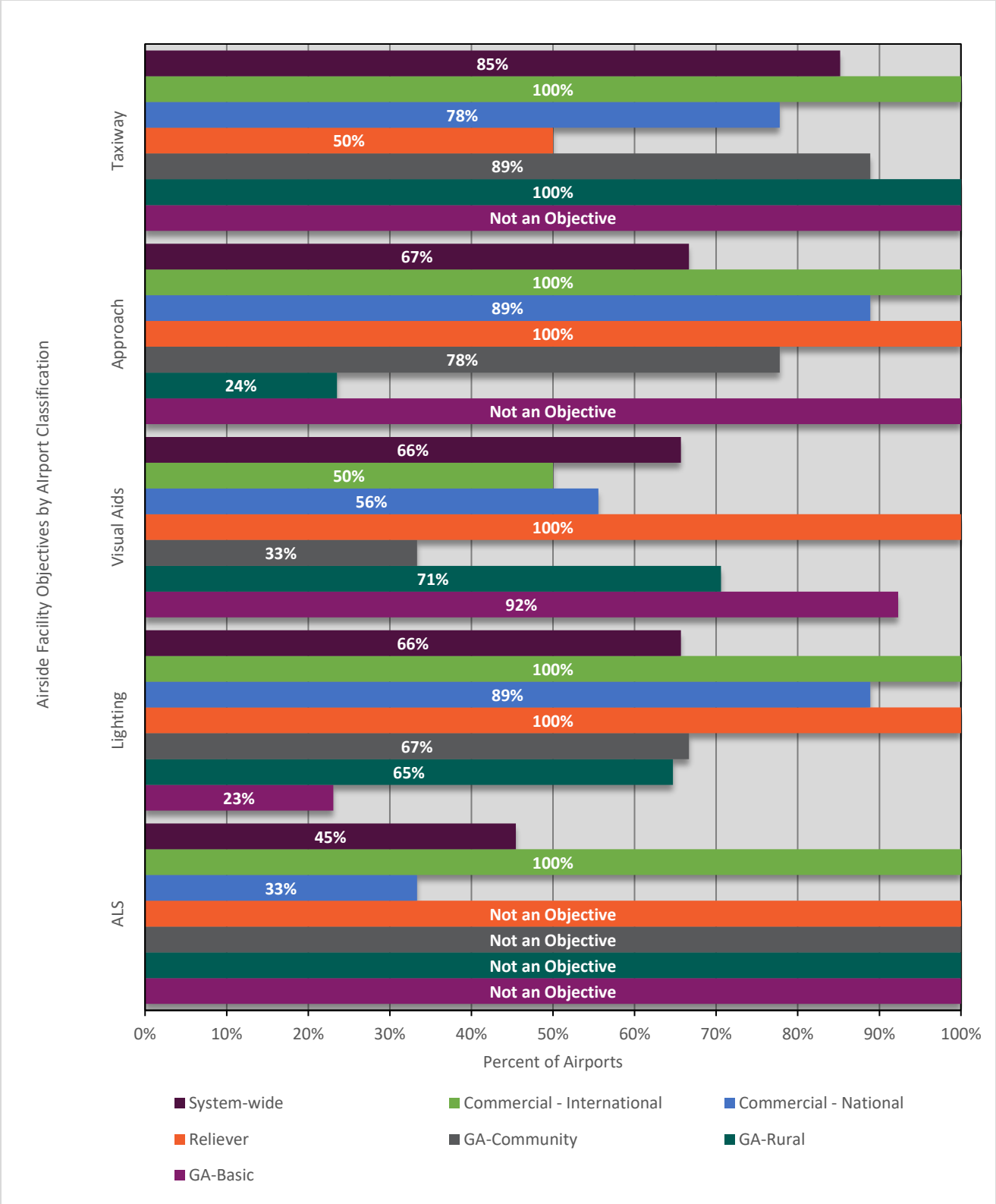
1. Airside facility objectives
2. Landside facility objectives
3. Landside service objectives

The results of the airside facility objectives have been split into two figures, and the landside service objectives have been split into four figures for ease of presentation. A more complete analysis of each airport and associated objective is provided in **Appendix E**, including the targets set for each objective by airport role, and a listing of airports not meeting each individual objective. The following figures represent a state-level snapshot of objective achievement.



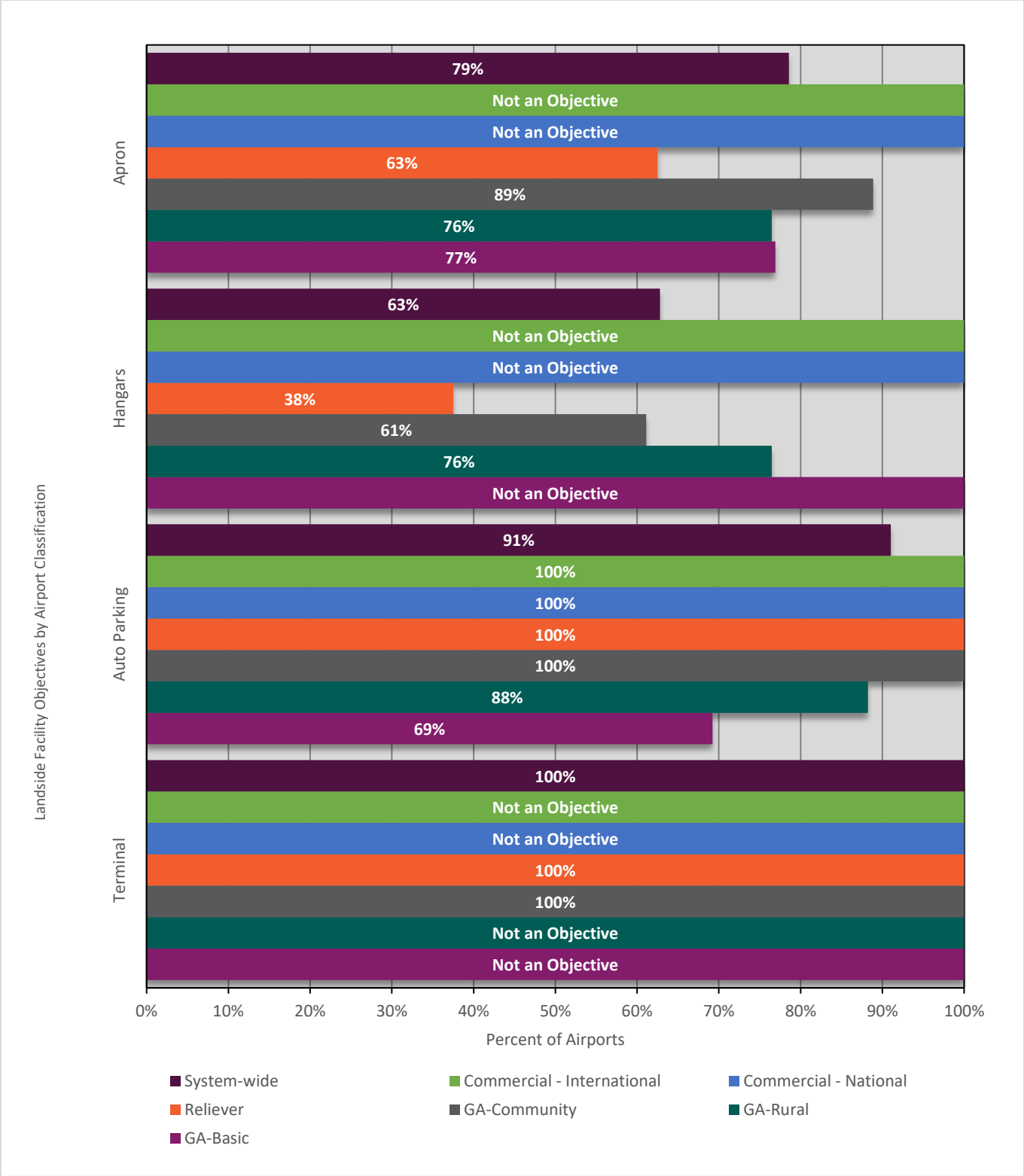
Sources: Airport Inventory and Data Survey 2017, FAA 5010 Airport Master Record

Figure 45. Percent of Airports by Classification Meeting Airside Facility Objectives (1 of 2)



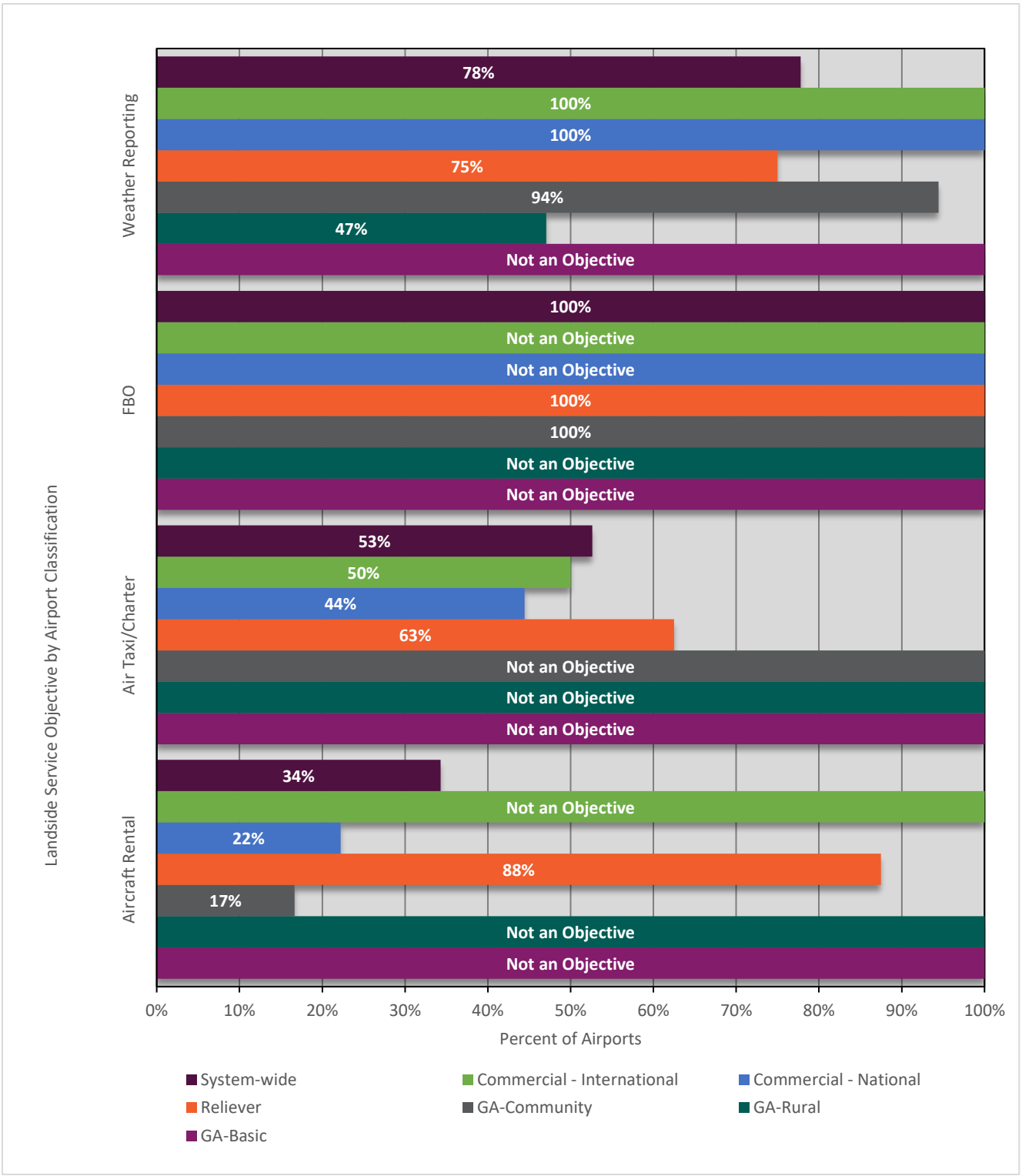
Source: Airport Inventory and Data Survey 2017

Figure 46. Percentage of Airports by Classification Meeting Airside Facility Objectives (2 of 2)



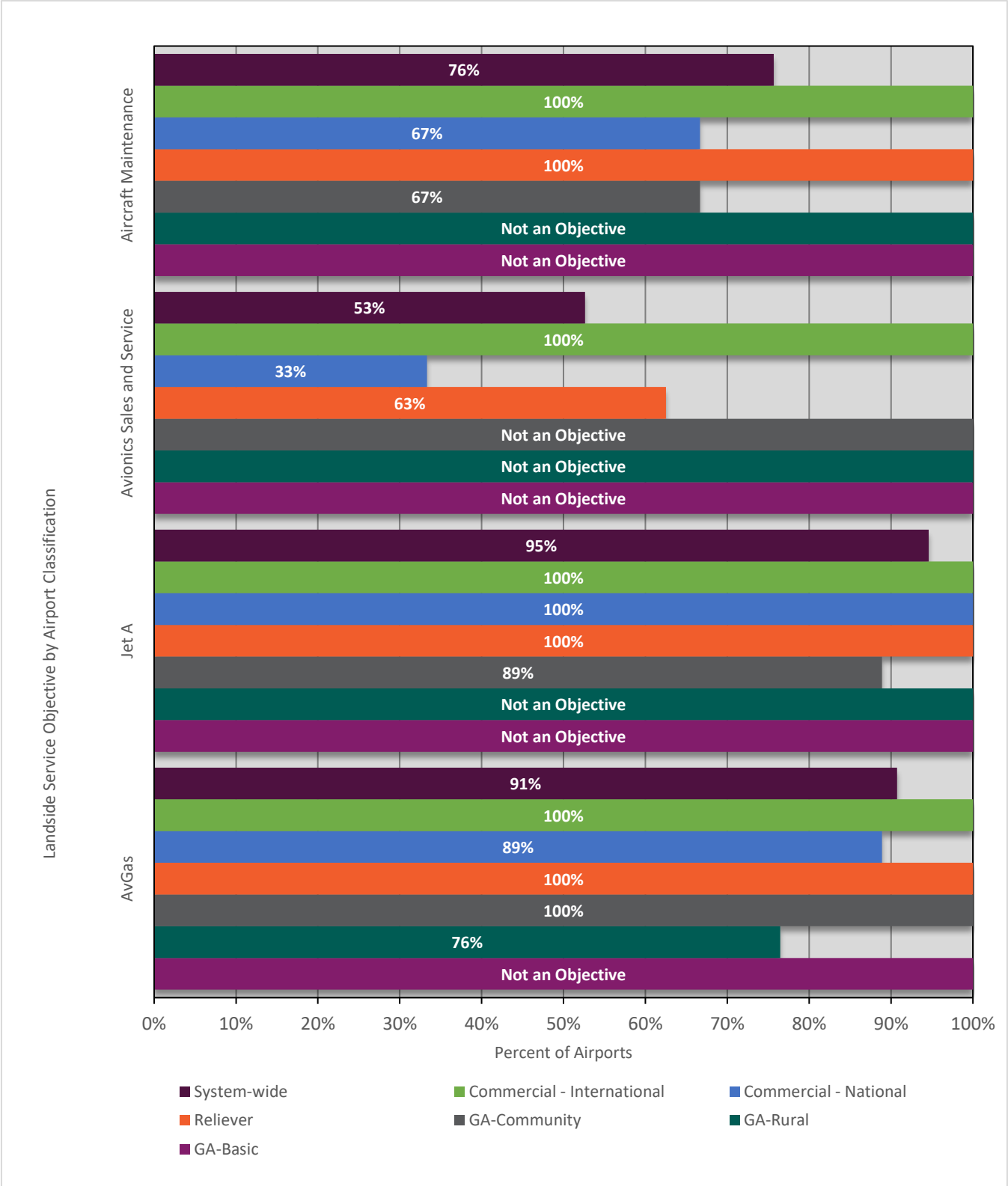
Source: Airport Inventory and Data Survey 2017

Figure 47. Percent of Airports by Classification Meeting Landside Facility Objectives



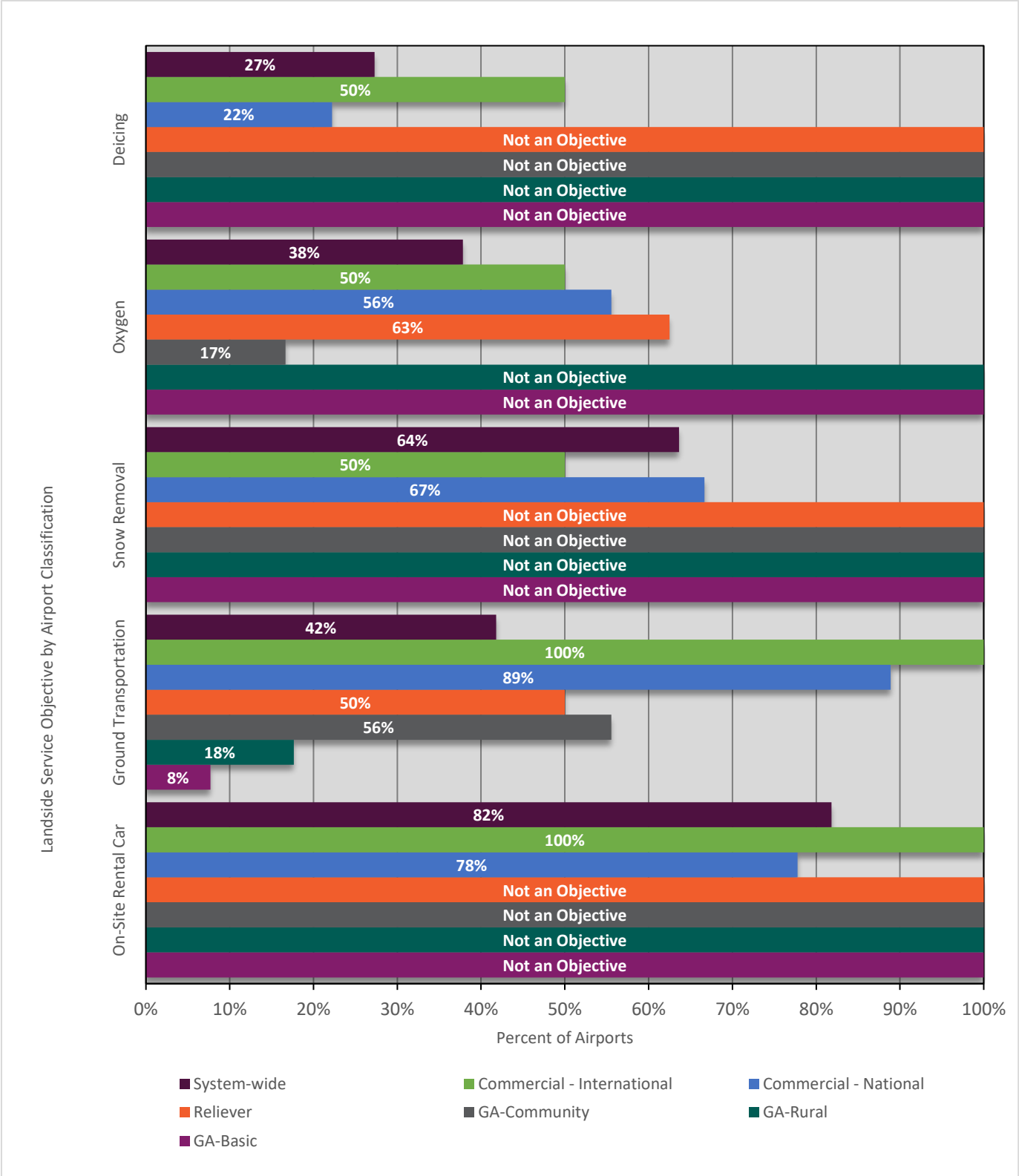
Source: Airport Inventory and Data Survey 2017

Figure 48. Percentage of Airports by Classification Meeting Landside Service Objectives (1 of 4)



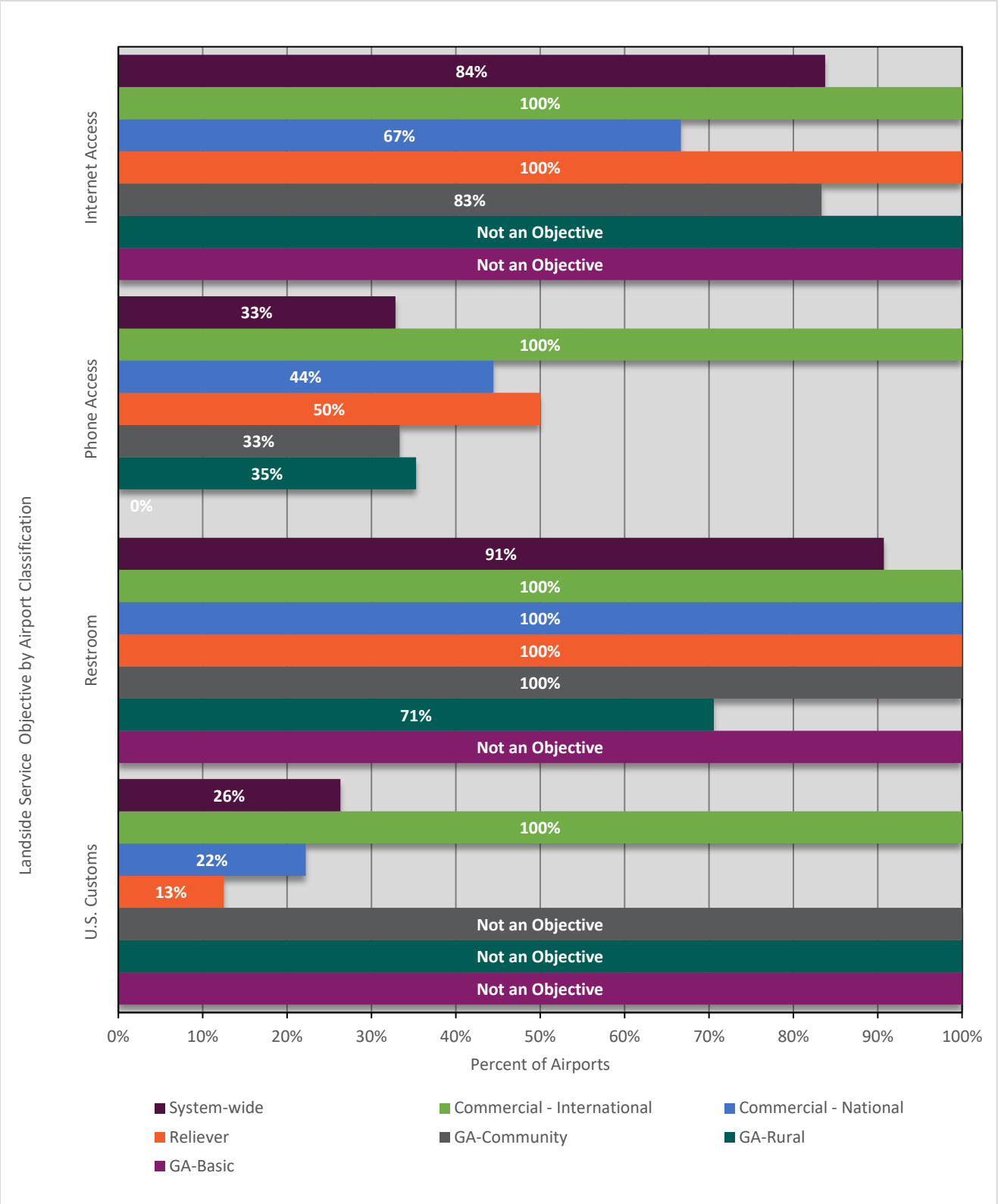
Source: Airport Inventory and Data Survey 2017

Figure 49. Percent of Airports by Classification Meeting Landside Service Objectives (2 of 4)



Source: Airport Inventory and Data Survey 2017

Figure 50. Percent of Airports by Classification Meeting Landside Service Objectives (3 of 4)



Source: Airport Inventory and Data Survey 2017

Figure 51. Percent of Airports by Role Meeting Landside Service Objectives (4 of 4)

SUMMARY

Assessing airports in terms of performance measures, system indicators, and geographic coverage identified areas in Arizona that effectively serve existing aviation need and pinpointed areas of potential improvement. Ninety-three percent of Arizona's population has access to an airport within a 30-minute drive time, providing residents, visitors, and business with exemplary levels of access, mobility, and resiliency in emergency situations—among the many other benefits associated with aviation. Together, commercial service and reliever airports make up 76 percent of operations statewide, and generally offer the widest range of facilities and services to airport users. Eighty-three percent of the state's population is within a 30-minute drive time of these airports. GA airports play unique roles at local, regional, and statewide levels. These airports can provide access to the most remote corners of the state, offer a layer of safety and security for residents, and serve as vital economic engines in their communities. Seventy-nine percent of the state's communities with a population of at least 1,000 has access to a GA airport within a 30-minute drive time.

While population coverage was a bright spot in the system, other performance measures offer important insight into system-wide opportunities for improvement that should be further evaluated to ensure the system continues to offer an optimal level of service to all users. While medical flights are one of the most valuable quality-of-life benefits of airports, only 30 percent of airports have all of the facilities and services identified as needed to most effectively support such operations by fixed-wing aircraft. That figure drops to 21 percent for GA airports. Twenty-eight percent of airports have clear approaches, which may pose safety concerns for pilots and passengers in the air and people and property on the ground. Policymakers, airports, and communities should carefully consider investment decisions to align limited resources with those areas where improvements could be most valuable. The APMS Implementation Program exemplifies the positive results that can arise when needs and resources are aligned. Resulting in large part from ADOT's commitment to ongoing pavement maintenance, 64 percent of primary runways in Arizona have PCIs greater than 70 percent.

For all measures, increasing the percent of airports that meet their performance measures is advised to maintain a safe and efficient system of airports in Arizona and the National Airspace System. Accordingly, specific recommendations for airport-specific and system-wide improvements will be developed in subsequent tasks.