

3.0 ACTIVITY PROJECTIONS

This chapter presents projections of passenger and aircraft activity that are used as the basis for the Sacramento International Airport Master Plan Study. These projections are essential for:

- Determining the future role of the Airport in both the type of aircraft to be accommodated and the type of aviation demand (e.g., passenger service, air cargo, general aviation) to be served in the future;
- Evaluating the capability of existing Airport facilities and their ability to absorb projected aviation demand; and
- Estimating the extent of airside and landside facilities that should be provided at the Airport in future years.

The development of the projections is discussed in the following sequence:

- Air Transportation Technology and Regulatory Trends
- Annual Passenger Projections
- Annual Cargo Poundage Projections
- Annual Operations and Fleet Mix Projections
- Peak Hour Projections
- Alternative Forecast Scenarios

The discussion of air transportation technology and trends describes the aviation environment in which the Airport will operate over the next 20 years. It is presented first because it is against this background that the projections were developed.

3.1 AIR TRANSPORTATION TECHNOLOGY AND TRENDS

In planning for future growth at the Airport it is important to understand the context within which the potential increases in air traffic will occur. Trends in aircraft, airline and airport technology routinely affect how airports deliver services. Perhaps one of the prime examples of how changes in the transportation environment can impact the delivery of airport services was the institution of security screening in the 1970s. Passengers suddenly had to flow through new single points of processing to reach their departure gate after arriving at the airport.

Recent security measures after the crash of a TWA flight off the coast of New York, such as the need for one-on-one identity checking, eliminated the issuance of advanced boarding passes and necessitated further changes in airline and airport procedures. A change as seemingly trivial as the prevalence of wheeled baggage altered passenger tendencies in checked versus carry-on baggage and affected design changes in aircraft interiors, as well as passenger processing times and procedures at our nation's airports.

This section discusses some of the changes on the horizon for the next 20 years that may have an impact on how passengers travel through airports and how airlines process these travelers. The section is organized as follows:

- Future Patterns of Air Services
- Nation-wide Projections of Passenger and Cargo Growth
- Future Growth of General Aviation
- Technological Trends in Aircraft Development
- Future Air Traffic Control Technology
- Pertinent Airport Facility Trends

3.1.1 Future Patterns of Air Services

In the quest for continued profitability, expanded market share, and in the environment of increased globalization of world economic activity, airlines are continually altering their operating models. Economics have driven and continue to drive mergers, alliances and consolidations among all variety of air carriers.

Majors are acquiring regionals, integrating their schedules, increasingly feeding hubs, and allowing service to smaller and smaller traffic points.¹ As the regionals feed traffic to hubs from smaller cities, carriers can increasingly add point-to-point service to intermediate-sized city-pairs that previously were required to fill planes in connecting banks of flights². These point-to-point flights need not be added to hubbing carriers' connecting banks at an airport; rather, they allow expansion of their timing patterns to offer flights outside of the peaks driven by intensive hubbing. This does not necessarily

reduce activity in these peak periods; rather, it expands departure and arrival activity into what were previously valleys in the timing pattern of a carrier at a hubbing airport.

Airlines continue to seek alliances in order to reach new markets. These alliances include code sharing, sharing of club space and frequent-flyer amenities, and sharing of ticketing/gating/baggage handling facilities. Thus, the perceived service offerings at an airport may seem wider than in the past, and may or may not be so. Alliances with international carriers and the desire for carriers to allow “seamless” services to travelers may drive the need for procedures at an airport not previously needed, such as checking of international documents and security procedures for screening passengers and baggage.

3.1.2 Nation-wide Projections of Passenger and Cargo Growth

Strong economic growth drove total passenger growth in domestic U.S. major carrier traffic of 3.9 percent per year in the 1990s. This reflected a growth of 3.7 percent annually for major carriers and 12.5 percent for regional carriers. Total traffic at the Airport grew 8.4 percent, a significantly higher rate than the national average for this period. At the Airport, this reflected an average annual growth of 9.4 percent by major carriers and an annual decline of 4.8 percent in regional traffic. Annual growth in total domestic U.S. traffic through 2020 is expected to be 3.7 percent, slightly lower than the 3.9 percent in the previous decade. As was the case historically, nation-wide travel by regional carriers will grow at 5.1 percent annually, higher than the major carrier rate of 3.4 percent per year.

Cargo on U.S. air carriers, as measured by revenue ton miles, grew 5.7 percent annually in the 1990s. This growth occurred despite a downturn in cargo revenue ton miles in 1999, which were 1.4 percent below 1998. In addition to strength in the economy, other factors that drove air cargo growth, domestically and worldwide, were changes in supply chain mechanisms over that time. Moves by manufacturers to just-in-

time methods to reduce inventory and growth in Internet sales contributed to the strong cargo growth.

This strength in both cargo and passenger volumes drove record profits for the airline industry in the decade. According to the FAA's Aerospace Forecasts, Fiscal Years 2000-2011, cumulative operating and net profits were \$34.6 and \$8.6 billion, respectively, 1990 through 1999.

Among the changes that drove the strength in the industry were declining yields and increased load factors, both driven by the carriers' increasing use of revenue management techniques.³ In response to pressure from low-fare, low-cost carriers, major carriers were driven to reduce their costs by operating more efficiently to maintain a competitive edge.

3.1.3 Future Growth of General Aviation

General aviation has made an extraordinary recovery from its severely depressed state in the early 1990s. Substantial increases in liability costs due to incidents involving aging general aviation aircraft had virtually halted aircraft production. Following the passage of the General Aviation Revitalization Act in 1994, all measures of general aviation activity have increased. According to the FAA, shipments of general aviation aircraft increased from a low of 928 units in 1994 to 2,220 units in 1998, an average annual growth of over 24 percent.

Programs by all segments of the industry are aimed at continuing healthy growth in activity. Manufacturers such as Cessna, Raytheon, Mooney and Piper are introducing new models of general aviation aircraft. Boeing Business Jets, Airbus and Fairchild are all marketing business jets. The FAA is promoting safety in general aviation in a variety of areas. Industry and government groups are joining efforts to improve technology in safety, engine reliability and efficiency, dissemination of weather information and navigational improvements.

The concept of fractional ownership of business jet aircraft is also expanding that segment of general aviation activity. Fractional ownership allows a corporation or individual to own a piece of an aircraft in a type of time-share situation. None of the fractional owners is required to provide pilots, maintenance or scheduling of the aircraft. Each fractional owner is entitled to a portion of the aircraft's time. This allows for use of a business jet without the need for a flight department in a corporation, and without the hassles of ownership for an individual. This concept could increase the use of corporate-type jets in the future. There is still some debate in the industry as to whether these operations should occur under Federal Aviation Regulation (FAR) part 91, as they currently do, or under the more demanding FAR Part 135. Upgrading the regulatory classification to FAR Part 135 may dampen the growth of this activity.

General aviation activity is projected to increase steadily over the forecast period. From 1999 through 2020, the nation's aircraft fleet is expected to grow 0.8 percent annually, hours flown are expected to increase 1.9 percent annually, and pilot population is expected to grow 1.9 percent annually.

3.1.4 Technological Trends in Aircraft Development

Among the most significant changes in recent years in aircraft development in commercial service in the United States is the emergence and growing role of regional jets. This, coupled with partnerships between major and regional carriers, has significantly restructured the route systems of both types of carriers. Regional jets allow longer-range capability, a higher degree of passenger comfort, and a perception of increased safety on the part of travelers relative to non-jet aircraft previously flown by commuters. This aircraft has freed up capacity for the majors, better rationalized fleet mix to market demand, and helped to increase load factors across the domestic system. According to Boeing's Current Market Outlook, the number of these jets in service is projected to grow almost 9 percent annually worldwide over the next 20 years. This is approximately twice the growth rate expected for all commercial passenger aircraft.

Over the forecast period, demand for large, long-range aircraft like the 747 is expected to decline as airlines choose to take advantage of the operational efficiencies offered by intermediate-sized, usually two-engine, newer aircraft. This aircraft type, such as the 757, 767 and Airbus 319/320 have the range to serve U.S. transcontinental markets and many international markets. In addition to the fuel efficiencies of only two engines, these aircraft require a cockpit crew of only two, further contributing to improved operating economics. Also, new versions of aircraft such as the 737 and A318, with seating in the 120-175 seat range, have provided major carriers with the option to economically offer high frequency in markets, which has stimulated additional traffic in the past decade.

3.1.5 Future Air Traffic Control Technology

The FAA has initiated several major programs over the last several years aimed at near-, intermediate-, and long-term solutions to increasing congestion and delays. Chief among these is the Free Flight Program. This program allows pilots and controllers to work together to manage air traffic more efficiently. It will allow pilots in the future to fly the most direct, cost-effective routes, reducing costs and delays. Some of the developments on-going in the FAA to support Free Flight are:

- **Enhanced Traffic Management System.** This system provides data on National Airspace System (NAS) facilities, airspace structures, airport differences, and aircraft distances. It enables traffic management specialists to regulate the flow of air traffic to minimize delays and congestion while maximizing the use of the NAS.
- **Departure Spacing Program.** This program assists air traffic controllers in sequencing departure times for a runway, sequencing departures across departure coordinates, and coordinating arrivals and departures when a common runway is in use. It also provides departure predictions to the traffic management system for use in predicting resource demand.
- **Host Oceanic Computer System Replacement.** This enroute center automation system is the foundation of the FAA's Automated Air Traffic Control environment. It receives, processes, coordinates, distributes and tracks information on aircraft movements throughout the NAS.

- Weather Assistance Radar Program. This program is intended to provide next generation weather radar information to air traffic controllers.

In addition to these programs, the FAA is working with the commercial aviation industry on a regular basis to address issues such as delays during peak summer activity periods and during periods of severe weather in large areas of the country.

There has been talk in the industry over the last several years about the potential benefits of privatizing the operation of the nation's airspace. However, at this time there are no signs that indicate a move towards that direction.

3.1.6 Pertinent Airport Facility Trends

Airport facility requirements will be affected by many of the changes discussed above. Increased service by regional carriers may require different types of ramp and connecting capabilities. As regional equipment evolves, and the desire by carriers to provide a "seamless" travel experience increases, ramp boarding and unloading of passengers become less desirable. The increasing predominance of airline alliances, which can be redefined frequently, may require increased flexibility in the location of carriers at an airport. When an alliance is formed, the involved carriers desire proximate, if not adjacent, ticketing/gating/baggage operations, club facilities, office space, etc. This will increase the need for flexibility in airport signage, assignment of space to carriers by airport management, and lease agreements between airports and carriers.

As large hubs and airports with heavy international traffic continue to grow, there may be an increased demand by air carriers to use technology to help manage their operations and facilitate the flow of customers from curb to plane. Technology such as the following may be considered in order to better manage airport staffing and improve the passenger's experience:

- Passive video displays or interactive kiosk set-ups for improved communication with passengers regarding flight status, stand-by list status, weather and flight alternatives.

- Increased automated check-in capability in the ticket counter area, gate area, and parking lots; and
- Automatic recording of passenger information such as: arrivals at the ticket counter; service times at counters, gates and checkpoints; and overall throughput time of outbound passengers.

The concept of airport privatization is more prevalent outside of the United States than domestically, but could become a factor in the future. As illustrated by the impact of airline deregulation, the private sector in the U.S. finds a way to exploit changes in the environment to its commercial benefit and to the service benefit of the U.S. consumer. It is possible that increasing privatization of airports in the U.S. could change the mix of services offered beyond merely facilitating the airlift of passengers and cargo. Meeting and communications services to business and convention travelers, expanded retail and dining opportunities, a broadened scope of services in baggage handling (check-in-to-hotel), and health and convenience facilities such as spas and dry cleaning, are all among the innovations that could evolve in the airport arena over the next 20 years.

3.2 ANNUAL PASSENGER PROJECTIONS

Master Plan Study projections for the Airport were developed for the years 2005, 2010, 2015 and 2020. The base year for passenger volume projections is 1999. For peaking analysis and 24-hour daily schedule development, 2000 data was used because it was readily available and represented the most current pattern and distribution of activity. The primary source of data was the Sacramento County Department of Airports. Other sources used were Official Airline Guide schedule data, U.S. Department of Transportation (DOT) data on origin/destination traffic and activity by carrier, Federal Aviation Administration annual forecasts, and Woods&Poole Economics data on historical and forecast county level socio-economic parameters⁴.

The projection of annual passenger activity is organized and presented as follows:

- Passenger Projection Methodology
- Passenger Projections
- O&D Domestic Passenger Market Analysis

- O&D International Passenger Market Analysis
- Summary of Passenger Projections

3.2.1 Passenger Projection Methodology

The Airport draws passengers from Sacramento and many of the surrounding counties. In some cases, passengers are attracted to the Airport even though they may live closer to San Francisco, Oakland or San Jose. Convenience of access and potentially lower air fares are factors in such diversion. Some of these issues were cited in a survey of area travel agents.

Historical activity at the Airport from 1980 through 1999 served as the basis for projecting passenger traffic through 2020. Projections were made using regression analysis relating the volume of travel at the Airport to socioeconomic factors in the surrounding region, the cost of air travel in Sacramento, and changes in service level at the Airport such as that experienced with the 1991 arrival of Southwest Airlines. In formulating the relationships among these factors, several different measures were used to represent the demand for air travel, the cost of air travel, and the socio-economic activity in the surrounding area.

Air travel demand was represented as total enplaned/deplaned passengers, and as origin/destination passengers. The cost of air travel was represented by the average fares at the Airport, and by airline yield at the Airport. Airline yield is the revenue collected by the airline for carrying one paying passenger one mile⁵. Given that there is some diversion from San Francisco to Sacramento, the average fare and average yield for San Francisco was also analyzed for its relationship to Sacramento traffic. The analysis was also adjusted to account for the introduction of low-fare service by Southwest in 1991. Southwest's entry into the Sacramento market produced a significant increase in traffic at the Airport.

Among the socioeconomic factors analyzed were population, personal income, per capita income and employment. The six counties that comprised the Sacramento

Area Council of Governments (SACOG) were analyzed, as were the adjoining counties of San Joaquin and Solano. The SACOG counties and San Joaquin counties were identified as significant sources of travelers at the Airport in passenger surveys conducted in 1998 and 1999 at the Airport. Solano County was included in the analysis because of its proximity and its potential for contributing future travelers to the Airport. Statistical analysis of the influence of these counties on traffic at the Airport led to the choice of the six-county SACOG area as the service region for the forecast.

In developing the statistical relationships among these variables, both linear and logarithmic formulations were considered. Linear formulations imply that the absolute growth in traffic is related to the absolute growth in the other variables. Logarithmic formulations imply that the rates of traffic growth are related to the rates of growth in the other variables.

The equation chosen was selected for its statistical goodness of fit to the historical data, and for its reasonableness in the implied relationships. This is graphically presented in **Exhibit 3.2-1**. This Exhibit displays the close agreement between the actual history, and the 1980 to 1999 passenger traffic predicted by the chosen equation. The equation and its statistics are presented below:

$$\begin{aligned} &\text{Log (Enplaned + Deplaned Passengers)} = \\ &+ \quad 2.964 \\ &+ \quad 1.102 * \text{Log (Per Capita Personal Income)} \\ &- \quad 2.035 * \text{Log (Sacramento International Airport Yield)} \\ &+ \quad 1.153 * \text{Log (San Francisco International Airport Yield)} \end{aligned}$$

R-Squared = .995

F Statistic = 517.23

Durbin-Watson Statistic = 1.92

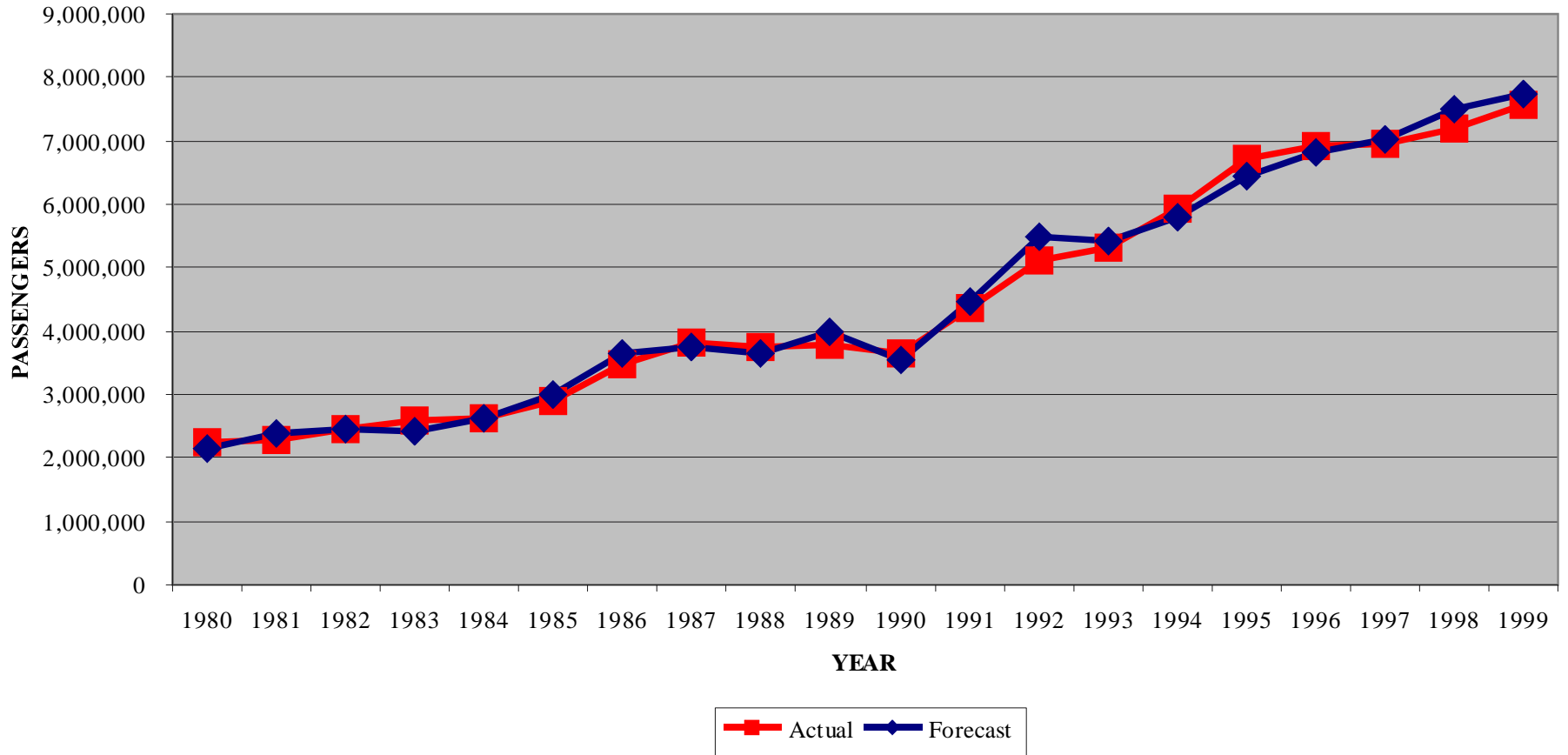
T Statistics:

Intercept = 9.85

Per Capita Personal Income = 19.10

Sacramento International Airport Yield = -9.50

San Francisco International Airport Yield = 5.13



Sacramento International Airport
Master Plan Study

ACTUAL vs. FORECAST
HISTORICAL ENPLANED + DEPLANED PASSENGERS

EXHIBIT
3.2.1

The positive coefficient of the per capita personal income variable indicates that Airport traffic increases as the SACOG area's income grows. The negative coefficient for Sacramento yield indicates that high yields at Sacramento exert a downward pressure on traffic. The positive coefficient for San Francisco yields indicates that as yields increase in San Francisco, traffic increases at Sacramento. This diversion of traffic to Sacramento to take advantage of lower fares confirms comments by travel agents.

The projections of passengers were developed based upon total activity at the Airport. Major and regional activity was projected based upon historical relationships and current developments. Similarly, origin/destination versus connecting traffic was determined based upon the historical relationship and discussions with air carriers regarding possible changes in the future.

3.2.2 Passenger Projections

Passenger activity at the Airport grew at an average annual rate of 6.4 percent from 1980 through 1999. This compares favorably with a 4 percent growth rate in domestic U.S. traffic over that time. Viewing the growth over smaller increments indicates that there have been several factors influencing total traffic growth. Total passenger activity at the Airport, historical and forecast, is presented in **Table 3.2-1**. This table indicates that annual growth in total traffic from 1980 through 1990 averaged 4.8 percent. From 1990 through 1995, average annual growth was over 13 percent. From 1995 through 1999, growth moderated to 2.9 percent per year. These fluctuations in growth result from the introduction of service by Southwest in 1991, and changes in the pattern and level of regional commuter activity over the time period studied. These factors are discussed in the following sections.

TABLE 3.2-1

Sacramento International Airport
DOMESTIC PASSENGER ACTIVITY

<u>Year</u>	<u>Enplaned Passengers</u>			
	<u>Major</u>	<u>Regional</u>	<u>Charter</u>	<u>Total</u>
1980	1,117,046	16,260	N/A	1,133,306
1981	1,114,601	21,330	N/A	1,135,931
1982	1,168,104	56,678	N/A	1,224,782
1983	1,253,081	40,607	N/A	1,293,688
1984	1,228,910	83,790	N/A	1,312,700
1985	1,360,088	85,915	N/A	1,446,003
1986	1,618,486	115,632	N/A	1,734,118
1987	1,767,308	145,984	N/A	1,913,292
1988	1,695,669	184,940	N/A	1,880,609
1989	1,687,591	199,206	N/A	1,886,797
1990	1,610,738	205,158	N/A	1,815,896
1991	1,997,292	178,690	N/A	2,175,982
1992	2,420,870	141,627	N/A	2,562,497
1993	2,508,919	152,397	N/A	2,661,316
1994	2,798,544	165,404	N/A	2,963,948
1995	3,173,801	169,671	10,484	3,353,956
1996	3,279,035	176,600	9,142	3,464,777
1997	3,309,196	173,166	1,552	3,483,914
1998	3,459,478	131,733	2,436	3,593,647
1999	3,629,631	132,259	2,733	3,764,623
Forecasts				
2005	4,821,100	164,600	3,500	4,989,200
2010	5,597,500	185,200	4,100	5,786,800
2015	6,762,100	216,500	4,900	6,983,500
2020	7,414,500	229,500	5,400	7,649,400
Average Annual Growth Rates				
1980-1990	3.7%	28.9%		4.8%
1990-1995	14.5%	(3.7)%		13.1%
1995-1999	3.4%	(6.0)%		2.9%
1999-2010	4.0%	3.1%		4.0%
2010-2020	2.9%	2.2%		2.8%

Note: 1980-1994 Regional enplanements estimated from T100 data.
 Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
 PB Aviation, Inc. Analysis

3.2.2.1 Major Carriers

The 3.7 percent average annual growth in traffic on major carriers 1980 through 1990 was slower than the national average of 4 percent. However, with the introduction of Southwest's service in 1991, traffic grew dramatically.

Enplaned passengers on domestic majors grew 24 percent from 1990 to 1991, and 21 percent 1991 to 1992 as Southwest introduced service to new and existing markets with low fares.

The major carriers at the Airport have carried the following share of total passenger traffic over the last five years:

	Majors'
<u>Year</u>	<u>Share</u>
1995	94.6 percent
1996	94.6 percent
1997	95.0 percent
1998	96.3 percent
1999	96.4 percent

This share was projected to grow to 96.6 percent in 2005, and up to 96.9 percent by 2020. The slight increase in share is reasonable given the fact that regional service has declined over the past few years.

This results in a forecast of major domestic traffic that is expected to increase 4 percent annually from 1999 through 2010, and 2.9 percent per year from 2010 through 2020. The growth is expected to be higher in the earlier period of the projections because some of Sacramento's origin/destination markets justify new non-stop service. This service will stimulate traffic, resulting in stronger growth earlier on in the projection period. This is discussed in more detail in the section on origin/destination markets.

From 1999 through 2020, the FAA projects domestic traffic on major carriers to grow at 3.4 percent annually. Sacramento's domestic major traffic in Table 3.2-1 grows at an average annual rate of 3.5 percent 1999 through 2020, slightly faster than the projected national average.

It is not expected that the Airport will become a hub for any major carrier during the forecast period. American and United currently have significant levels of activity at San Francisco and San Jose, which they would be unlikely to duplicate at Sacramento beyond what is there now. The presence and dominance of Southwest and its low fares are strong deterrents to a major carrier's adding competing service. Any service added at the Airport must compete with Southwest's low fare offerings.

3.2.2.2 Regional Carriers

Regional service at the Airport has fluctuated significantly over the period included in the forecast. The markets served by commuter carriers are presented in **Table 3.2-2**. Since 1980, 21 cities have received service by regional carriers from Sacramento. At the height of regional activity, from 1988 through 1990, 12

cities were served. Currently, only Eureka/Arcata, Crescent City and San Francisco receive regional service. The carriers providing the service do so in partnership with major carriers.

TABLE 3.2-2

Sacramento International Airport

PATTERN OF COMMUTER SERVICE

Carrier(s)		Code	City	Miles	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	Years Served
	Westair	ACV	Eureka / Arcata	206	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	17
Pacific Coast	Skywest	Westair	BFL	Bakersfield	266			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			17
			BUR	Burbank	358									X	X	X	X									4
	Skywest	Westair	CEC	Crescent City	254															X	X	X	X	X	X	6
		Westair	CIC	Chico	77			X	X	X	X	X														6
		Century	EKA	Murray Field	206	X																				1
Pacific Coast	Skywest	Westair	FAT	Fresno	168			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			16
	Skywest	Inland Empire	LAX	Los Angeles	373			X								X	X	X	X	X	X	X		X		9
			LGB	Long Beach	387								X	X	X	X										4
	Skywest	Westair	MRY	Monterey	146				X	X	X		X	X	X											7
		Westair	RDD	Redding	130				X	X	X	X	X	X	X											6
	Skywest	Wings West	RNO	Reno, Nevada	113								X	X	X	X	X	X	X	X						9
		Skywest	SAN	San Diego	480														X							1
	Skywest	Westair	SBA	Santa Barbara	310		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			18
	Skywest	Wings West	SBP	San Luis Obispo	244			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			17
Wings West	Skywest	Westair	SFO	San Francisco	85	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	20
Wings West	Skywest	Westair	SJC	San Jose	94			X	X	X	X	X	X	X	X	X	X	X								12
		Wings West	SMX	Santa Maria	269				X	X																2
			SNA	Santa Ana	404									X	X	X										3
		Inland Empire	VIS	Visalia	204			X																		1
		21	Cities Served			3	3	10	9	11	9	9	11	12	12	12	11	8	9	9	9	8	8	7	3	3

Source: T100 Statistics
 Official Airline Guide
 PB Aviation, Inc. Analysis

This fluctuation in service levels caused the fluctuations in regional traffic seen in Table 3.2-1. The peak regional passenger years of 1988 to 1990 coincide with the period during which 12 cities were served in this category. In recent years, regional carrier activity has declined significantly.

In the past, regionals were independent operators providing point-to-point service, between smaller cities, and from small cities to larger cities such as Sacramento, Los Angeles or San Francisco. However, the role of regionals has evolved recently to operating in partnership with major carriers, usually feeding traffic to the majors at hubs. United Airlines' commuter partners provide service between Sacramento and the smaller cities of Eureka and Crescent City. United uses commuter service to feed traffic from Sacramento to its hub in San Francisco.

Because Sacramento is not a hub for any major carrier, it is unlikely that a large regional network will grow there. In the past five years, regionals' share of traffic at the Airport has declined as follows:

Regionals'	
<u>Year</u>	<u>Share</u>
1995	5.1 percent
1996	5.1 percent
1997	5.0 percent
1998	3.7 percent
1999	3.5 percent

This share is expected to continue its gradual decline to 3.3 percent of traffic in 2005, down to 3.1 percent in 2020.

This results in an average annual growth rate of just over 3 percent from 1999 through 2010, and 2.2 percent 2010 through 2020. This is much slower growth than the nation will see in regional traffic growth, as regionals in other parts of the country continue to support hub growth for the majors.

3.2.2.3 Charter Carriers

Charter activity at the Airport is minimal. Data available over the last five years indicates that there was some activity in 1995 and 1996 to Hawaii, but that activity has been sporadic recently. In 1998 and 1999 charter traffic represented less than one percent of total activity at the Airport. This activity is projected to be 0.7 percent of enplanements throughout the forecasting period.

3.2.3 O&D Domestic Passenger Market

Total passenger enplanements and deplanements were the basis for the projection methodology described above. Origin/destination (O&D) traffic was then forecast as a percentage of this total based on the historical relationship. O&D traffic at the Airport has represented approximately 95 percent of total Airport traffic over the last 10 years. This data is presented in **Table 3.2-3**. The traffic that is not O&D represents connecting passengers. As Southwest expands its operations at the Airport, the potential for connecting traffic increases slightly, so the percentage that will be originating or terminating is decreasing slightly. By 2020 it is projected that total Airport traffic will be 95 percent true O&D and 5 percent connecting.

TABLE 3.2-3

Sacramento International Airport

DOMESTIC ORIGIN / DESTINATION TRAFFIC

Year	(1) Airport Enplanements + <u>Deplanements</u>	(2) Origin / Destination <u>Traffic</u>	(3) O & D Percent of <u>Total Traffic</u> (2)/(1)	(4) <u>Connections</u> (1)-(2)	(5) Connecting Percent of Enplaned + <u>Deplaned</u> (2)/(1)
1990	3,631,791	3,409,160	93.9%	222,631	6.1%
1991	4,351,964	4,140,450	95.1%	211,514	4.9%
1992	5,124,994	4,886,940	95.4%	238,054	4.6%
1993	5,322,632	5,119,020	96.2%	203,612	3.8%
1994	5,927,896	5,629,770	95.0%	298,126	5.0%
1995	6,704,470	6,426,380	95.9%	278,090	4.1%
1996	6,935,305	6,658,130	96.0%	277,175	4.0%
1997	6,967,280	6,689,590	96.0%	277,690	4.0%
1998	7,201,378	6,874,540	95.5%	326,838	4.5%
1999	7,554,892	7,228,050	95.7%	326,842	4.3%
Forecasts					
2005	9,978,500	9,529,500	95.5%	449,000	4.5%
2010	11,573,500	11,029,500	95.3%	544,000	4.7%
2015	13,966,900	13,282,500	95.1%	684,400	4.9%
2020	15,298,800	14,533,800	95.0%	765,000	5.0%
Average Annual Growth Rates					
1990-1995	13.0%	13.5%		4.5%	
1995-1999	3.0%	3.0%		4.1%	
1999-2010	4.0%	3.9%		4.7%	
2010-2020	2.8%	2.8%		3.5%	

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
US DOT O&D Survey
PB Aviation, Inc. Analysis

The top 30 O&D markets for Sacramento in 1999 are presented in **Table 3.2-4**. O&D traffic in the DOT 10 percent sample for 1980, 1985, 1990, 1995 and 1999 is listed for each city. The cities are listed in order of 1999 O&D traffic. Those cities currently receiving non-stop service to and from Sacramento are noted with an asterisk (*). Also listed are the average annual growth rates experienced by each of the markets from 1990 through 1995, and from 1995 through 1999.

TABLE 3.2-4

Sacramento International Airport

ORIGIN / DESTINATION CITY ANALYSIS

1999 Rank	ORIGIN / DESTINATION PASSENGERS (10% SAMPLE)	Avg. Ann. Growth %		Estimated Potential One-Way Passengers per Day									
		1990-1995	1995-1999	1999	2005	2010	2015	2020					
	(*=NonStop Service) Top O&D	1980	1985	1990	1995	1999							
1	Los Angeles *	42,152	45,576	37,962	70,767	83,652	13.3	4.3	1,146	1,514	1,755	2,118	2,321
2	San Diego *	13,326	17,551	20,580	62,538	68,319	24.9	2.2	936	1,236	1,434	1,730	1,895
3	Ontario *	16,521	22,756	23,557	57,622	63,598	19.6	2.5	871	1,151	1,335	1,611	1,764
4	Burbank *	13,488	18,118	18,481	59,871	58,225	26.5	(0.7)	798	1,053	1,222	1,475	1,615
5	Seattle/Tacoma *	5,520	6,805	10,480	37,979	40,349	29.4	1.5	553	730	847	1,022	1,119
6	Las Vegas *	1,330	4,592	8,945	27,007	39,104	24.7	9.7	536	708	821	990	1,085
7	Portland *	4,475	3,688	6,567	26,769	38,819	32.5	9.7	532	702	815	983	1,077
8	Phoenix *	1,016	7,540	8,134	25,187	29,705	25.4	4.2	407	537	623	752	824
9	Santa Ana *	18,575	18,130	23,874	31,025	19,410	5.4	(11.1)	266	351	407	492	538
10	Salt Lake City *	2,744	3,765	5,654	17,583	15,639	25.5	(2.9)	214	283	328	396	434
11	Denver *	5,322	6,472	10,032	10,464	13,216	0.8	6.0	181	239	277	335	367
12	Chicago *	3,204	5,877	10,723	11,493	12,526	1.4	2.2	172	227	263	317	347
13	Baltimore	563	894	2,055	3,004	9,391	7.9	33.0	129	170	197	238	261
14	Dallas/Fort Worth *	2,223	4,843	7,705	9,309	9,208	3.9	(0.3)	126	167	193	233	255
15	Atlanta *	836	1,694	3,122	6,065	9,091	14.2	10.6	125	164	191	230	252
16	New York/Newark	2,137	4,249	8,481	8,226	8,832	(0.6)	1.8	121	160	185	224	245
17	Washington *	1,892	4,016	7,203	8,643	7,750	3.7	(2.7)	106	140	163	196	215
18	Orlando	251	1,183	3,049	4,540	7,467	8.3	13.2	102	135	157	189	207
19	Spokane	655	753	1,565	5,659	7,029	29.3	5.6	96	127	148	178	195
20	Houston *	888	1,938	3,135	4,914	6,270	9.4	6.3	86	113	132	159	174
21	Kansas City *	1,037	1,962	2,703	5,192	5,970	13.9	3.6	82	108	125	151	166
22	St Louis *	1,026	1,892	2,673	4,813	5,965	12.5	5.5	82	108	125	151	165
23	Minneapolis/St Paul *	1,481	2,469	4,802	5,838	5,724	4.0	(0.5)	78	104	120	145	159
24	Albuquerque	505	1,632	1,927	5,118	5,155	21.6	0.2	71	93	108	131	143
25	San Antonio	693	1,294	1,860	3,505	4,719	13.5	7.7	65	85	99	120	131
26	Tucson	113	1,667	2,124	4,224	4,697	14.7	2.7	64	85	99	119	130
27	Boston	821	2,122	4,407	5,972	4,649	6.3	(6.1)	64	84	98	118	129
28	San Francisco *	4,058	1,350	3,369	3,743	4,566	2.1	5.1	63	83	96	116	127
29	Philadelphia	669	1,585	2,900	3,844	4,095	5.8	1.6	56	74	86	104	114
30	Detroit	2,017	2,064	2,668	3,309	4,047	4.4	5.2	55	73	85	102	112
Top 30 Markets % of Total		83.8%	81.6%	73.5%	83.1%	82.6%							

Source: USDOT O&D Survey

The growth rates for the period of 1990 to 1995 are extremely high. Nine of the top ten markets experienced double-digit growth, most in excess of 20 percent annually. All of these double-digit growth markets have received service by Southwest Airlines, which began serving the Airport in 1991. Southwest has not offered service to Santa Ana, and it served Salt Lake City only briefly. Since 1995, the growth has moderated.

The largest market currently without non-stop service is Baltimore, followed by New York/Newark.⁶ Baltimore's growth has been extremely high during the 1995 to 1999 period. This is due to the introduction of single-plane, low-fare service in the market by Southwest. It is interesting to note that while Baltimore's traffic has been

increasing, Washington's traffic declined between 1995 and 1999. Southwest's service offers an attractive alternative to connecting service to Washington for a segment of the market. United Airlines' introduction of non-stop service to Washington (Dulles International Airport) in 1999 may reverse that trend.

It is also interesting to note that O&D traffic to Boston has declined significantly, 6.1 percent annually, during the 1995 to 1999 period. This is most likely due to Southwest's introduction of single-plane, low-fare service to Providence, Rhode Island from Sacramento. Providence is a reasonable alternative to Boston for a segment of that market. While Providence is still too small to appear in the top 30 Sacramento O&D markets, it has risen from Sacramento's 84th largest O&D market in 1995 to its 42nd largest O&D market in 1999. Over that period, Boston fell from 17th to 27th.

The last five columns in Table 3.2-4 indicate when a market might be able to support non-stop service. The markets currently without non-stop service that are eligible to receive it throughout the forecast period are listed in bold face type. The criterion used to determine support of non-stop service was a 70 percent load factor on a 175-seat aircraft, or 123 passengers one way per day. All of the markets except Philadelphia qualify for non-stop service during the forecast period. It was assumed that Detroit would qualify because it is not as distant as the other markets and could be served with a smaller aircraft. Traffic in these markets was grown at the average growth in the passenger forecast. Baltimore, New York, Orlando and Spokane qualify for non-stop service in 2005. Albuquerque qualifies in 2015. San Antonio, Boston, Tucson and Detroit qualify in 2020.

Non-stop service provided by major carriers at Sacramento from 1990 through 1999 is presented in **Table 3.2-5**. The cities are listed alphabetically. Currently, only five cities are served by more than a single carrier:

- | | <u>Market</u> | <u>Carriers</u> |
|---|-----------------|---------------------------|
| • | Las Vegas, NV | Southwest America West |
| • | Los Angeles, CA | United Southwest |
| • | Phoenix, AZ | America West Southwest |
| • | Portland, OR | Southwest Horizon |
| • | Seattle, WA | Alaska Southwest |

TABLE 3.2-5

Sacramento International Airport

AIR SERVICE CHARACTERISTICS

(page 1 of 3)

		<u>Delta</u>					
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>			
Atlanta	1990						
	1995						
	1999	107,473	589	68.7			
		<u>Southwest</u>			<u>US Airways</u>		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Burbank	1990				144,905	1,356	55.1
	1995	468,853	3,464	68.8			
	1999	445,139	3,367	74.1			
		<u>United</u>			<u>American</u>		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Chicago	1990	191,407	1,332	64.3	122,830	865	56.7
	1995	191,376	1,434	71.6	37,251	268	69.2
	1999	184,889	1,234	77.9			
		<u>American</u>			<u>Delta</u>		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Dallas/Fort Worth	1990	204,668	1,442	66.1	147,269	1,035	41.6
	1995	245,169	1,764	72.9	104,546	743	62.9
	1999	198,140	1,430	80.6			
		<u>United</u>			<u>Continental</u>		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Denver	1990	146,215	1,129	67.1	86,138	714	56.9
	1995	231,224	1,771	76.4			
	1999	267,774	1,959	77.9			
		<u>Southwest</u>			<u>America West</u>		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Las Vegas	1990				139,458	1,077	44.9
	1995	139,524	1,092	75.6	44,292	363	78.7
	1999	280,433	2,074	73.1	42,195	361	67.9

TABLE 3.2-5

Sacramento International Airport

AIR SERVICE CHARACTERISTICS

(page 2 of 3)

		United			Southwest			US Airways		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Los Angeles	1990	170,122	1,483	46.9				214,062	1,802	49.7
	1995	289,548	2,403	76.8	293,885	2,155	69.7			
	1999	358,428	2,822	78.4	351,273	2,604	73.4			
		Northwest								
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>						
Minneapolis/St. Paul	1990	71,799	600	67.9						
	1995	111,356	777	70.9						
	1999	119,919	800	78.2						
		Southwest			American					
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>			
Ontario	1990				155,335	1,095	56.7			
	1995	429,882	3,186	74.1						
	1999	460,166	3,388	78.8						
		America West			Southwest					
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>			
Phoenix	1990	127,068	1,027	48.6						
	1995	161,879	1,283	67.3	115,725	870	60.1			
	1999	226,352	1,777	72.5	150,997	1,106	66.2			
		Southwest			Horizon			United		
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>
Portland	1990							117,781	981	35.8
	1995	187,728	1,374	66.3	73,500	1,186	67.2	22,881	178	44.1
	1999	240,977	1,771	70.6	136,620	1,980	67.4			
		Trans World								
<u>Destination</u>	<u>Year</u>	<u>Seats</u>	<u>Departures</u>	<u>Load Factor</u>						
Saint Louis	1990									
	1995	95,660	721	64.7						
	1999	112,728	797	82.4						

TABLE 3.2-5

Sacramento International Airport

AIR SERVICE CHARACTERISTICS

(page 3 of 3)

Destination	Year	Delta			Southwest					
		Seats	Departures	Load Factor	Seats	Departures	Load Factor			
Salt Lake City	1990	182,053	1,447	58.2						
	1995	190,135	1,433	70.9	49,734	364	73.6			
	1999	217,600	1,437	83.0						
Destination	Year	Southwest			United			US Airways		
		Seats	Departures	Load Factor	Seats	Departures	Load Factor	Seats	Departures	Load Factor
San Diego	1990				80,306	638	46.9	133,410	1,377	55.3
	1995	436,223	3,229	68.7	154,656	1,277	48.6			
	1999	523,689	3,897	71.3						
Destination	Year	United			American					
		Seats	Departures	Load Factor	Seats	Departures	Load Factor			
San Francisco	1990	43,530	356	13.4	21,016	148	15.7			
	1995									
	1999									
Destination	Year	America West			US Airways			American		
		Seats	Departures	Load Factor	Seats	Departures	Load Factor	Seats	Departures	Load Factor
Santa Ana	1990				98,901	1,221	52.0	117,159	917	39.8
	1995	289,459	2,226	55.6						
	1999	199,254	1,507	47.5						
Destination	Year	Alaska			Southwest			United		
		Seats	Departures	Load Factor	Seats	Departures	Load Factor	Seats	Departures	Load Factor
Seattle	1990							167,851	1,279	44.5
	1995	250,807	1,795	62.0	148,482	1,087	68.4	56,935	425	41.3
	1999	266,159	1,919	69.0	192,007	1,406	66.9			
Destination	Year	United								
		Seats	Departures	Load Factor						
Washington	1990									
	1995									
	1999	14,562	112	62.8						

Source: T100 Statistics
PB Aviation, Inc. Analysis

Various carriers have dropped service to many cities rather than compete with other carriers in these markets. As hubs began to dominate service in the late 1980s and early 1990s, some carriers dropped service to concentrate on feeding major hubs. The service offered by each carrier is described below.

Southwest carries the largest share of passengers at the Airport, 51 percent in 1999. It offered the following service in 1999:

	<u>City</u>	<u>Daily Departures</u>	<u>Load Factor</u>	<u>Competitor</u>
•	Burbank	10	74.1 percent	
•	Las Vegas	6	73.1 percent	America West
•	Los Angeles	8	78.4 percent	United
•	Ontario	11	78.8 percent	
•	Phoenix	4	72.4 percent	America West
•	Portland	5	70.6 percent	Horizon
•	San Diego	11	71.3 percent	
•	Seattle	4	69.0 percent	Alaska

United Airlines is the Airport's next largest competitor, with 17 percent of Sacramento's traffic in 1999. It serves Chicago (four flights per day, 77.9 percent full), Denver (five to six flights per day, 77.9 percent full), and Los Angeles (seven flights per day, 78.4 percent full). In 1999 United began service non-stop to Washington, Dulles with one flight per day, operating at a load factor of 62.8 percent. United's commuter partner serves San Francisco with 16 daily flights. United served Portland from 1981 through 1985 and again from 1988 through 1995. Both Horizon and Southwest started Portland service in 1994. When Pacific Southwest ceased service to San Diego in 1988, United initiated service there and served it through 1992, when Southwest entered that market. United served San Diego again from mid-1994 through 1995. United was also the primary service provider to Seattle through 1995. Alaska Airlines entered that market in 1993, and Southwest entered in 1994.

America West carried 7.6 percent of the Airport's traffic in 1999. It has been in Sacramento since 1985. In 1999 America West provided one daily departure to Las Vegas at a 67.9 percent load factor, and six daily flights to Phoenix at a load factor of 72.5 percent. The carrier also flies to Santa Ana five to six times daily at a load factor of 47.5 percent.

Delta carried 6.8 percent of the Airport's traffic in 1999. Delta began its non-stop Atlanta service in 1997. It offers two departures daily and experienced a load factor of 68.7 percent in 1999. Delta also serves Salt Lake City non-stop from Sacramento. It has consistently served this market with four daily departures. This load factor has grown

from 58.2 percent in 1990, to 70.9 percent in 1995, to a 1999 level of 83 percent. Southwest offered service in this market with one departure daily between 1995 and 1997, but load factors fell to the low 40 percent range and service was discontinued there in 1998. Delta also offered non-stop service to Dallas/Fort Worth from 1989 through 1997 with two to three departures daily. This service was discontinued when the Atlanta service was introduced.

Alaska Airlines carried 5 percent of the Airport's traffic on its non-stop service to Seattle. It offers five departures daily and operates at a 69 percent load factor.

American Airlines carried 4.3 percent of the traffic on its four daily flights to Dallas/Fort Worth, at a load factor of 80.6 percent in 1999. American had previously served Chicago (discontinued 1995), Oakland (1984 to 1987), Ontario (1985 until Southwest's entrance in 1991), San Francisco (1988 to 1989), and Santa Ana (1987 to 1994). From 1987 through 1990, American Airlines carried over 20 percent of the traffic at the Airport.

In 1999 Northwest carried 2.5 percent of Sacramento's passengers on its two to three daily departures to Minneapolis/St. Paul at a load factor of 78.2 percent. This service has been fairly constant since 1989. Since 1994 TWA has operated two to three daily departures to Saint Louis, recently at a load factor of 82.4 percent. This represents 2.5 percent of Sacramento's traffic. Horizon carried 2.5 percent of the traffic on its five daily flights to Portland. Its load factor in 1999 was 67.4 percent. Continental operates two daily departures to Houston. Statistics were not available for this recently introduced service.

Thus it is evident that the O&D traffic supporting Sacramento's overall passenger volume is strong and will continue to grow through the forecast period. This growing O&D base will support continuing and expanding service to major carriers' hubs, and will also encourage non-stop service to new markets, stimulating further traffic growth.

3.2.4 O&D International Passenger Market

International traffic at Sacramento was reviewed using the DOT passenger survey statistics. These statistics record those passengers traveling internationally who started their trips at the Airport. Because there is no international service non-stop at Sacramento, these passengers were connecting to the international leg of their journey at another point. It is logical to assume that many passengers traveling internationally might have driven to San Francisco to initiate their international air travel. In fact, this assumption is confirmed by information obtained from travel agents in the Sacramento Metropolitan Area.

DOT statistics indicate that passengers departing from the Airport are traveling to many international destinations. However, the DOT statistics indicate that the only countries with more than 10 international passengers departing on average per day at Sacramento in 1999 were:

<u>Country</u>	<u>1999 Average Daily Departing Passengers</u>
Mexico	45
Canada	79
United Kingdom	19
Germany	14

These four international destinations are considered as candidates for receiving non-stop service from the Airport. Assumptions under which these markets would receive non-stop services are discussed below. **Table 3.2-6** presents the assumptions for each of these markets.

TABLE 3.2-6

**Sacramento International Airport
INTERNATIONAL PASSENGER ACTIVITY**

Year	Average Daily Departing Passengers				Estimated Total Daily Departing Passengers			
	Mexico	Canada	U. K.	Germany	Mexico (50% Div)	Canada (20% Div)	U. K. (60% Div)	Germany (60% Div)
	1990	31	30	9	9	62	37	22
1991	27	35	10	8	54	44	24	21
1992	26	41	15	11	51	51	39	27
1993	24	47	14	12	48	59	35	29
1994	18	42	16	10	35	52	40	25
1995	24	45	16	11	48	56	40	27
1996	33	53	13	12	65	66	33	29
1997	32	61	17	13	64	77	42	32
1998	40	82	18	15	80	102	44	38
1999	45	79	19	14	89	98	48	35
Forecasts					Daily Departing			
					(365 Days)		(210 Days)	
2005					118	130	111	81
2010					137	151	144	105
2015					166	183	185	134
2020					182	200	235	171
Forecasts					Annual O&D			
2005					86,400	95,200	46,800	33,900
2010					100,300	110,500	60,500	43,900
2015					121,200	133,500	77,600	56,400
2020					132,900	146,300	98,700	71,700
Average Annual Growth Rates								
1990-1995	(5.0)%	8.4%	12.2%	4.6%				
1995-1999	17.0%	15.2%	5.0%	7.0%				
1999-2010	10.8%	6.1%	14.2%	14.2%				
2010-2020	2.9%	2.9%	5.0%	5.0%				

Note: Forecasts rounded to the nearest 100.

Source: US DOT O&D Survey
PB Aviation, Inc. Analysis

Sacramento-originating passengers destined for Mexico grew from 31 in 1990 to 45 in 1999. For Mexico, it was assumed that the Sacramento-originating travelers represented 50 percent of the total market, with the other 50 percent having been diverted to San Francisco. If this were the case, the true number of travelers to Mexico from the Sacramento area is estimated at 62 in 1990 and 89 in 1999. Many carriers would find this sufficient to support non-stop service. If this traffic were to grow at the same rate as domestic traffic at the Airport, departing travelers to Mexico would number 118 in 2005,

and 182 in 2020. This level of traffic would support a strong load factor on a 150-seat aircraft. United Airlines is in an alliance with Mexicana, and Delta is allied with AeroMexico. It is possible that either of these U.S. carriers could offer service to Mexico City from Sacramento, and this traffic could be distributed across Mexico by their international partner carriers.

Canada reported daily departures of 30 passengers, on average, in 1990 and 79 in 1999. If these passengers represented 80 percent of Sacramento travel to Canada, with only 20 percent diverted to San Francisco, daily departures to Canada from the Sacramento area would have been 37 in 1990 and 98 in 1999. Growing this traffic at the same rate as domestic traffic estimates 2005 potential daily departures to Canada at 130, growing to 200 by 2020. This traffic could easily support one flight in 2005, and possibly two by 2015. United is in partnership with Air Canada. If United delivered these passengers to Vancouver, the largest destination in Canada for Sacramento passengers, Air Canada could distribute them to other destinations across the country.

The O&D surveys reported a daily average of 19 travelers to the U. K. and 14 to Germany from Sacramento in 1999. For the United Kingdom and Germany, it is assumed that the Sacramento O&D passengers represent only 40 percent of the total. It is assumed that 60 percent of U.K. and Germany passengers in the Sacramento service area drove to San Francisco for their departure. This is not an unreasonable assumption given the input from local travel agents. Under this assumption, there were 48 daily departures from the Sacramento service area in 1999, and 35 to Germany. Over the forecast period, it is unlikely that these markets could grow to support daily non-stop service from the Airport. However, assuming the growth forecast for the Trans-Atlantic market, the U.K. and Germany could support five weekly departures from Sacramento by 2015 and 2020, respectively. These assumptions are presented in Table 3.2-6. On a 250-seat aircraft, such as a 767-ER, a 70 percent load factor would require 175 passengers per departure. The U.K. would reach this level by 2015, and Germany would be close to that level in 2020.

From 1990 through 1999 Mexico, Canada, the U.K and Germany have represented approximately 60 percent of Sacramento's international traffic. With non-stop service in these markets, they are expected to grow to approximately 70 percent of the Airport's international traffic. The international traffic not flying to these destinations is expected to grow at the rate forecast by the FAA for international travel through 2020.

3.2.5 Summary of Passenger Projections

Projections for all elements of passenger activity are presented in **Table 3.2-7**. In summary, total passenger traffic at the Airport is projected to grow at an average annual rate of 3.5 percent from 1999 through 2020. This growth incorporates domestic growth of 3.4 percent per year, which matches the FAA's projection of 3.4 percent for the country over that time frame. International traffic at the Airport is expected to grow to a point that will warrant non-stop service to Canada and Mexico during the 2000 to 2005 forecast period. Traffic on the major carriers will grow at 3.5 percent annually, and the regionals will grow at 2.7 percent per year. Both O&D and connections will grow at similar rates as the character of service at the Airport is not expected to change significantly over the forecast period. Connections will remain at approximately 5 percent of total traffic as carriers primarily serve their hubs from Sacramento, with some new point-to-point flying due to growth in the Airport's O&D demand.

3.3 ANNUAL CARGO POUNDAGE PROJECTIONS

Much of the cargo activity in Sacramento County's airport system has been shifted away from the Airport to Mather Airport. However, some cargo activity is expected to remain at the Airport. Its location relative to major highways and major business communities makes the Airport attractive for time-sensitive overnight shipments. Several freight operators and their feeders will remain at the Airport and major passenger carriers are expected to increase their cargo activity as the size of aircraft increases over time allowing for growth in belly cargo.

TABLE 3.2-7

Sacramento International Airport

SUMMARY OF PASSENGER ACTIVITY FORECASTS

Year	Enplaned Passengers				
	Major	Regional	Charter	International	Total
1995	3,173,801	169,671	10,484	60,330	3,414,286
1996	3,279,035	176,600	9,142	66,920	3,531,697
1997	3,309,196	173,166	1,552	77,840	3,561,754
1998	3,459,478	131,733	2,436	93,235	3,686,882
1999	3,629,631	132,259	2,733	95,040	3,859,663
Forecasts					
2005	4,821,100	164,600	3,500	181,700	5,170,900
2010	5,597,500	185,200	4,100	223,000	6,009,800
2015	6,762,100	216,500	4,900	278,300	7,261,800
2020	7,414,500	229,500	5,400	331,500	7,980,900
Average Annual Growth Rates					
1995-1999	3.4%	(6.0)%	(28.5)%	12.0%	3.1%
1999-2010	4.0%	3.1%	3.6%	8.1%	4.1%
2010-2020	2.9%	2.2%	2.8%	4.0%	2.9%

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
US DOT O&D Survey
PB Aviation, Inc. Analysis

The projections also assume that mail will continue to be carried into and out of the Airport. A mail sorting facility, nearby companies providing mailing services to national corporations, and on-going contracts between the United States Postal Service (USPS) and major passenger carriers all will contribute to the growth of mail activity at the Airport.

Historical and projected freight and mail volumes are presented in **Table 3.3-1**. These forecasts are discussed in the following sections.

3.3.1 Freight Poundage

Total freight at the Airport was growing rapidly prior to the decision to shift such activity to Mather. From 1984 through 1990, total freight grew at an average annual rate of almost 23 percent annually, as indicated in Table 3.3-1. From 1990 through 1995,

TABLE 3.3-1

Sacramento International Airport

CARGO ACTIVITY

Year	Freight (Pounds)			Mail (Pounds)		
	On	Off	Total	On	Off	Total
1984	5,817,140	6,526,348	12,343,488	14,091,294	3,929,458	18,020,752
1985	7,193,611	9,582,172	16,775,783	10,443,710	2,245,501	12,689,211
1986	7,129,975	9,754,445	16,884,420	12,496,441	2,173,866	14,670,307
1987	7,966,251	10,877,191	18,843,442	16,604,999	3,216,267	19,821,266
1988	9,344,404	12,956,174	22,300,578	14,526,771	3,123,990	17,650,761
1989	11,442,077	16,342,416	27,784,493	17,467,674	2,768,932	20,236,606
1990	19,064,777	23,206,963	42,271,740	20,224,305	2,640,530	22,864,835
1991	20,596,427	25,656,196	46,252,623	18,812,358	3,332,263	22,144,621
1992	25,356,528	27,375,762	52,732,290	17,038,155	8,568,328	25,606,483
1993	35,570,787	37,686,652	73,257,439	16,256,620	9,831,507	26,088,127
1994	44,019,247	44,141,026	88,160,273	16,789,142	11,453,447	28,242,589
1995	61,047,091	61,854,826	122,901,917	18,512,901	9,864,357	28,377,258
1996	59,509,759	55,783,690	115,293,449	19,191,927	9,784,454	28,976,381
1997	66,825,862	65,374,243	132,200,105	24,725,847	10,765,700	35,491,547
1998	61,976,584	61,084,985	123,061,569	25,065,892	8,918,318	33,984,210
1999	51,686,827	50,444,563	102,131,390	23,230,230	8,358,146	31,588,376
Forecasts						
2005	98,418,100	96,469,200	194,887,300	31,174,200	11,010,100	42,184,300
2010	123,488,700	121,043,400	244,532,100	36,184,200	12,779,500	48,963,700
2015	150,456,100	147,476,700	297,932,800	41,573,300	14,682,900	56,256,200
2020	179,270,500	175,720,600	354,991,100	47,331,500	16,716,500	64,048,000
Average Annual Growth Rates						
1984-1990	21.9%	23.5%	22.8%	6.2%	(6.4)%	4.0%
1990-1995	26.2%	21.7%	23.8%	(1.8)%	30.2%	4.4%
1995-1999	(4.1)%	(5.0)%	(4.5)%	5.8%	(4.1)%	2.7%
1999-2010	8.2%	8.3%	8.3%	4.1%	3.9%	4.1%
2010-2020	3.8%	3.8%	3.8%	2.7%	2.7%	2.7%

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
PB Aviation, Inc. Analysis

total freight grew at 23.8 percent per year, indicating that there is a vibrant market for air cargo in the Sacramento area. Even though several cargo carriers left the Airport to provide their services at Mather, and total freight volume fell from 1995 to 1999, those carriers that remained at the Airport (Fed Ex, DHL, West Air Industries) grew 9 percent per year between 1995 and 1999. Thus, it is expected that freight will remain a factor at the Airport.

3.3.1.1 Freight Poundage Methodology

Total freight volume was projected using regression analysis, relating socioeconomic activity in the six-county SACOG area to freight volume from 1981 through 1999. The six-county area proved to be statistically more closely related to freight volumes at the Airport than other service areas analyzed. Variables such as population, personal income, per capita income, employment, and retail sales were analyzed for their potential relationship to freight volumes. Both linear and logarithmic relationships were evaluated. The relationship selected, for its goodness of fit and the reasonableness of the forecast, is graphically presented in **Exhibit 3.3-1**. This exhibit displays the actual history and the 1981 through 1999 freight volume predicted by the chosen equation. The equation and its statistics are presented below.

$$\begin{aligned} \text{Total On + Off Freight} = \\ - 141,596,160 \\ + 15.905 * (\text{Six-county SACOG Retail Sales}) \end{aligned}$$

R-Squared = .881

F Statistic = 118.70

T Statistics:

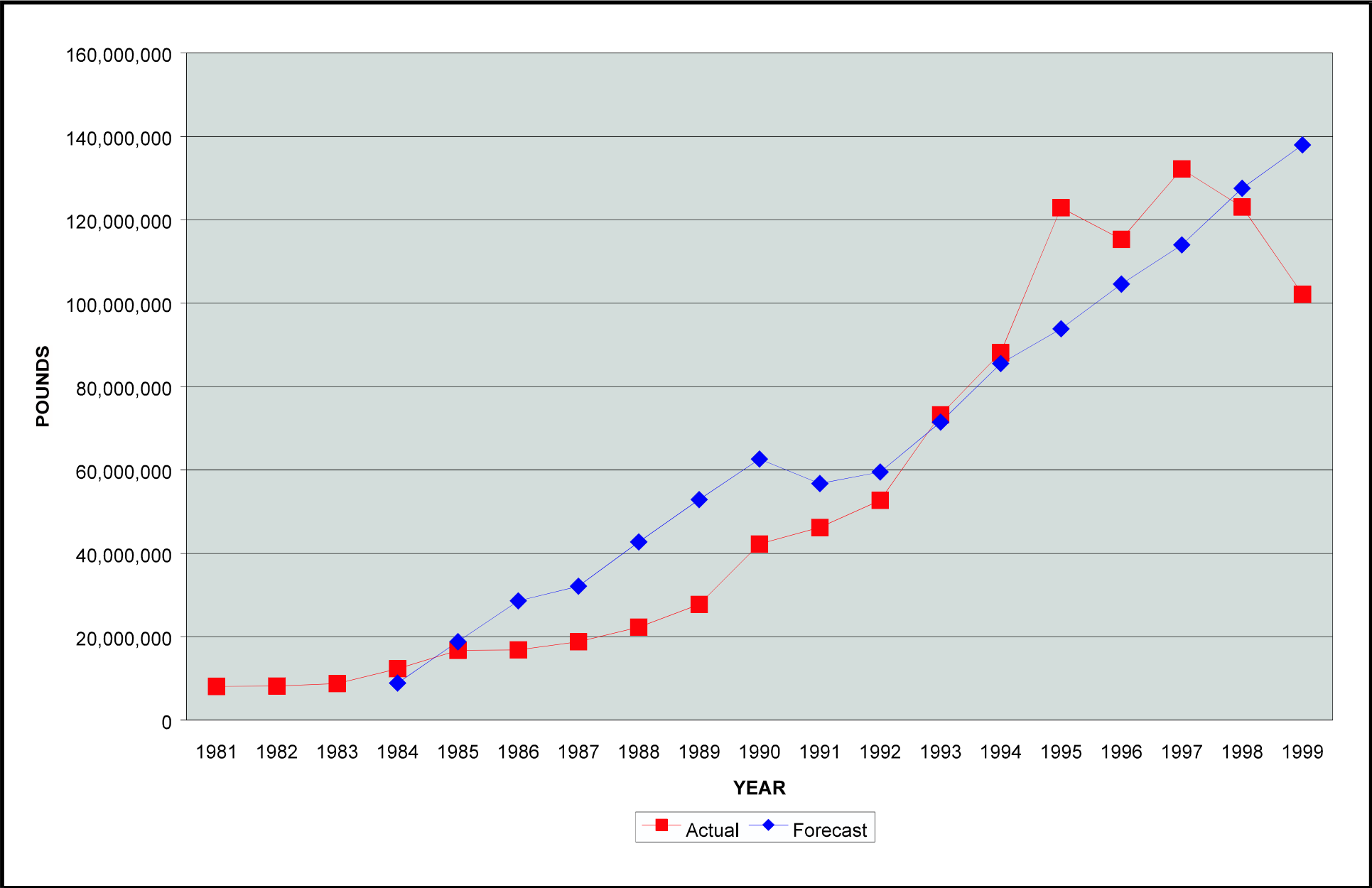
Intercept = -7.79

Retail Sales = 10.89

Following the projection of total freight, On and Off Freight were separated based upon the historical relationship between the two. Off freight in the forecast represents 49.5 percent of the total, while On Freight represents 50.5 percent.

3.3.1.2 Freight Projections

The projections in Table 3.3-1 indicate that total freight is projected to grow at the Airport 8.2 percent annually through 2010, and 3.8 percent annually thereafter. Recall that growth between 1995 and 1999 for the cargo carriers still serving the Airport was 9 percent annually. Thus the forecast continues the recent trend and tapers off in the later years of the forecast. Also, the all-cargo activity at the Airport represents approximately 89 percent of total cargo activity there, the remainder being carried on major passenger carriers.



**Sacramento International Airport
Master Plan Study**

ACTUAL vs. FORECAST HISTORICAL FREIGHT

**EXHIBIT
3.3-1**

3.3.2 Mail Poundage

Mail at the Airport has grown at an average annual rate of 4 percent from 1984 through 1990, 4.4 percent from 1990 through 1995, and 2.7 percent from 1995 through 1999. Most of the mail at the Airport is carried on major passenger carriers under contract with the USPS.

3.3.2.1 Mail Poundage Methodology

The methodology for forecasting mail was similar to that used for freight. Regression analysis was used to establish a relationship between total mail volume and socio-economic variables in the Sacramento service area. As with passengers and freight, the six-county SACOG area proved to be the most statistically significant service area definition for mail volume. Of the socio-economic variables analyzed, retail sales demonstrated the strongest relationship to mail volume. The relationship selected is presented graphically in **Exhibit 3.3-2**. The exhibit displays the actual history and the 1981 to 1999 mail volume predicted by the equation. The chosen equation and its statistics are presented below.

$$\begin{aligned} \text{Total On + Off Mail} &= \\ & - 3,765,783.5 \\ & + 2.17 * (\text{Six-County SACOG Retail Sales}) \end{aligned}$$

$$\text{R-Squared} = .79$$

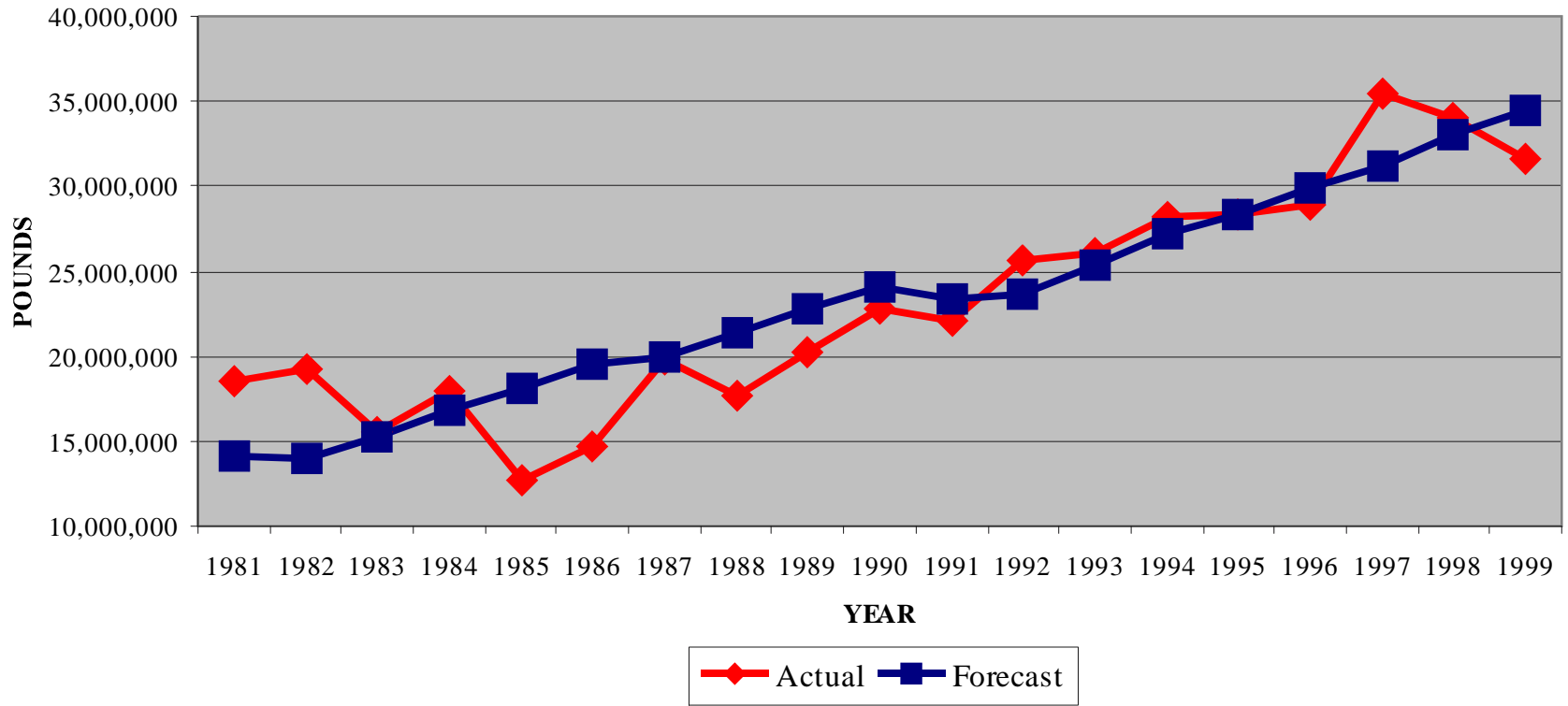
$$\text{F Statistic} = 60.63$$

T Statistics:

$$\text{Intercept} = -1.08$$

$$\text{Retail Sales} = 7.79$$

Total mail was separated into On and Off Mail based upon the historical relationship. On Mail is projected to represent 73.9 percent of the total throughout the forecast period. This reflects two factors. One is that mail coming into Sacramento (Off Mail) from across the country has more flight options for arriving at San Francisco, San Jose or Oakland, and then being trucked into Sacramento. Outbound mail (On Mail) can conveniently be assembled at Sacramento and loaded there on outbound aircraft to major sorting centers at the airlines' hubs. A second factor is that there is a business located near the Airport that sends out bills for national companies. It sends its outbound mail (On Mail) via the Airport.



Sacramento International Airport
Master Plan Study

ACTUAL vs. FORECAST MAIL

EXHIBIT
3.3.2

3.3.2.2 Mail Projections

The mail projections resulting from this methodology are presented in Table 3.1-1. Mail is projected to grow at 4.1 percent between 1999 and 2010, and 2.7 percent after that through 2020. The USPS indicates that it intends to continue contracting with major carriers to haul mail at Sacramento, and there is a sorting facility there to support that effort. It would be difficult for the USPS to transfer its activity out of the Airport. Major carriers provide a dependable source of transport for mail, with good frequency to destinations that have sorting facilities that support the entire country. This level of lift would not be available to the USPS at any other airport in the Sacramento area.

3.4 ANNUAL OPERATIONS AND FLEET MIX PROJECTIONS

The volume projections discussed above were used to forecast the number of aircraft operations at the Airport through 2020. Along with the operations projections, the mix of aircraft types expected to perform these operations is also projected. As with the passenger and cargo volume projections, the primary source of data was the Sacramento County Department of Airports. Information from aviation industry sources and aircraft manufacturers was used in determining the future configuration of the aircraft fleet.

The projection of aircraft operations is organized and presented as follows:

- Major Carrier Operations and Fleet Mix
- Regional Carrier Operations and Fleet Mix
- Charter Carrier Operations and Fleet Mix
- All Cargo Operations and Fleet Mix
- General Aviation Operations and Fleet Mix
- Military Operations and Fleet Mix
- Summary of Operations and Fleet Mix Projections

3.4.1 Major Carrier Operations and Fleet Mix

Major carrier domestic operations are presented in **Table 3.4-1**. The table indicates that departures on majors have grown at 5.2 percent annually from 1984 through 1990, 7.3 percent per year from 1990 through 1995, and 1.6 percent annually from 1995 through 1999.

TABLE 3.4-1

Sacramento International Airport

MAJOR CARRIER DOMESTIC OPERATIONS

<u>Year</u>	<u>Operations</u>	<u>Departures</u>	<u>Seats Per Departure</u>	<u>Load Factor</u>
1984	39,494	19,747	130.8	52.6%
1985	43,892	21,946	127.6	53.0%
1986	53,131	26,566	122.0	56.3%
1987	58,722	29,361	122.8	54.1%
1988	60,211	30,106	121.5	53.0%
1989	55,491	27,746	120.5	54.8%
1990	53,506	26,753	123.5	51.8%
1991	56,977	28,489	128.3	57.9%
1992	65,408	32,704	131.7	61.2%
1993	66,877	33,439	132.0	61.9%
1994	67,041	33,521	127.4	70.6%
1995	76,229	38,115	126.1	68.0%
1996	78,438	39,219	126.3	68.7%
1997	79,284	39,642	128.2	67.4%
1998	79,670	39,835	128.3	70.7%
1999	81,285	40,643	129.6	73.1%
Forecasts				
2005	101,100	50,500	134.4	71.0%
2010	113,200	56,600	138.4	71.5%
2015	131,900	66,000	142.4	72.0%
2020	139,700	69,900	146.4	72.5%
Average Annual Growth Rates				
	<u>Operations</u>	<u>Departures</u>	<u>Seats Per Departure</u>	<u>Load Factor Points</u>
1984-1990	5.2%	5.2%	(1.2)	(0.1)
1990-1995	7.3%	7.3%	1.0	3.2
1995-1999	1.6%	1.6%	0.9	1.3
1999-2010	3.1%	3.1%	0.8	(0.1)
2010-2020	2.1%	2.1%	0.8	0.1

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
PB Aviation, Inc. Analysis
FAA Aerospace Forecasts

Domestic aircraft operations for the major carriers were projected starting with the passenger forecast as a base, and then making assumptions regarding aircraft size and load factors. Dividing the number of passengers by the load factor determines how many seats are needed to accommodate the traffic forecast. Dividing this number of total seats needed by the expected average number of seats per aircraft determines the number of aircraft implicit in the passenger forecast.

Average load factors have increased over time from 1984 through 1999. This pattern in Sacramento reflects the general pattern in the aviation industry. Load factors have risen from the mid-50s range in the 1980s, into the 60 percent range, and are now at all-time high levels. As carriers rationalize their fleets and route systems, and as they become increasingly more adept at manipulating their pricing systems to fill airplanes, load factors have increased. However, it is difficult to operate an entire system at sustained load factor levels in the high 70 percent range. Therefore, the forecast assumes that load factors will range from 71 percent in 2005 up to 72.5 percent in 2020. This level slightly exceeds the 70 percent load factors assumed by the FAA in its annual forecasts.

Over the period analyzed, the average size of aircraft measured by seats per departure has ranged from a low of 120.5 seats in 1989 to a high of 131.7 seats in 1992, as indicated in Table 3.4-1. Currently, the Airport's departures average 129.6 seats per departure on major carriers. It is assumed that aircraft size will grow at 0.8 seats per year through 2020. As the Airport generates the demand to support new service, as discussed in earlier sections, it is likely that this demand will be flown on aircraft at the larger end of the Airport's fleet mix spectrum. This is because the new markets foreseen are long-haul markets. Also, many of the newer aircraft coming on line for the carriers have more seats than the 131-seat 737-300 that is currently the workhorse of the fleet at Sacramento. This average growth in seats per departure is also in keeping with the FAA's assumption in its forecast. By 2020, it is expected that Sacramento will have an average of 146.4 seats per departure on its aircraft. Implicit in this forecast is the assumption that the Airport will not see service on long-haul, wide-body aircraft.

These assumptions result in the forecast of aircraft operations presented in Table 3.4-1. Major carrier operations are projected to grow at 3.1 percent annually through 2010, and 2.1 percent per year after that. This growth rate is a bit slower than the growth in passenger traffic because of the increasing size of the aircraft and a fairly stable load factor.

The fleet mix supporting major carrier domestic activity is presented in **Table 3.4-2**. The 737-300s flown by Southwest currently dominate activity at the Airport, operating over 50 percent of the major carriers' flights. Over time it is expected that flight activity will shift to slightly larger aircraft such as the 737-700 and the 737-800 in the fleets of and on order by American, Southwest, Continental and Delta. United is expected to transition to Airbus aircraft in the 148-seat range. This transition is depicted in Table 3.4-2. The 737-700 will dominate by 2020 with 34 percent of operations, followed by the A320, 737-800 and 757s. Average seat size will increase from the 1999 level of 129.6 to 146.4 in 2020.

International operations are presented in **Table 3.4-3**. Traffic generated by Mexico and Canada will support non-stop service by 2005 with seven flights weekly. Canada service will grow to 14 weekly flights by 2015, and Mexico will have two flights per day by 2020. The United Kingdom is expected to grow to support non-stop service by 2015, with five weekly departures through 2020. Germany will support five weekly departures by 2020. This activity will generate 1,500 international operations by 2005, growing to 4,000 operations by 2020.

TABLE 3.4-2

Sacramento International Airport

MAJOR CARRIER DOMESTIC FLEET MIX

<u>Equipment</u>	<u>Seats</u>	<u>Annual Operations</u>				
		<u>1999</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
F28	69	4,226	2,807	1,406		
F100	97		2,106	3,514	4,939	4,915
737-500	104	7,246	4,913	7,731	7,761	4,915
737-200	118	2,894	6,317	3,514		
737-300	131	45,920	44,216	28,113	9,877	
737-700	137	3,632	10,528	20,382	40,214	47,047
MD80	142	6,408	4,211	2,108	2,117	
737-400	144	2,362	3,509	5,623	6,350	6,320
727-200	148	2,721	2,807	2,811		
A320	148	2,431	7,018	20,382	33,159	40,025
737-800	162		7,720	10,542	18,343	21,066
757	180	<u>3,444</u>	<u>4,913</u>	<u>7,028</u>	<u>9,172</u>	<u>15,448</u>
	Total	81,285	101,066	113,153	131,932	139,738
		<u>Distribution by Equipment Type</u>				
<u>Equipment</u>	<u>Seats</u>	<u>1999</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
F28	69	5.2%	2.8%	1.2%	0.0%	0.0%
F100	97	0.0%	2.1%	3.1%	3.7%	3.5%
737-500	104	8.9%	4.9%	6.8%	5.9%	3.5%
737-200	118	3.6%	6.3%	3.1%	0.0%	0.0%
737-300	131	56.5%	43.8%	24.8%	7.5%	0.0%
737-700	137	4.5%	10.4%	18.0%	30.5%	33.7%
MD80	142	7.9%	4.2%	1.9%	1.6%	0.0%
737-400	144	2.9%	3.5%	5.0%	4.8%	4.5%
727-200	148	3.3%	2.8%	2.5%	0.0%	0.0%
A320	148	3.0%	6.9%	18.0%	25.1%	28.6%
737-800	162	0.0%	7.6%	9.3%	13.9%	15.1%
757	180	<u>4.2%</u>	<u>4.9%</u>	<u>6.2%</u>	<u>7.0%</u>	<u>11.1%</u>
	Total	100.0%	100.0%	100.0%	100.0%	100.0%
Seats Per Departure		129.6	134.4	138.4	142.4	146.4

Source: Sacramento County Airport System
 PB Aviation, Inc. Analysis
 Aviation Industry sources

TABLE 3.4-3								
Sacramento International Airport								
INTERNATIONAL OPERATIONS								
<u>Estimated Daily Originating Passengers</u>								
<u>Year</u>	<u>Mexico</u>	<u>Canada</u>	<u>U. K.</u>	<u>Germany</u>				
1990	62	37	22	21				
1991	54	44	24	21				
1992	51	51	39	27				
1993	48	59	35	29				
1994	35	52	40	25				
1995	48	56	40	27				
1996	65	66	33	29				
1997	64	77	42	32				
1998	80	102	44	38				
1999	89	98	48	35				
<u>Forecast Daily Originating Passengers</u>								
<u>Forecasts</u>	<u>(365 Days)</u>		<u>(201 Days)</u>		<u>Forecast Weekly Departures</u>			
	<u>Mexico</u>	<u>Canada</u>	<u>U. K.</u>	<u>Germany</u>	<u>Mexico</u>	<u>Canada</u>	<u>U. K.</u>	<u>Germany</u>
2005	118	130	111	81	7	7	0	0
2010	137	151	144	105	7	7	0	0
2015	166	183	185	134	7	14	5	0
2020	182	200	235	171	14	14	5	5
<u>Forecast Annual Operations</u>								
<u>Forecasts</u>	<u>Mexico</u>	<u>Canada</u>	<u>U. K.</u>	<u>Germany</u>	<u>Total International Operations</u>			
2005	728	728	0	0	1,500			
2010	728	728	0	0	1,500			
2015	728	1,456	520	0	2,700			
2020	1,456	1,456	520	520	4,000			

Note: Forecasts rounded to the nearest 100.

Source: DOT International O&D Survey
 FAA Aerospace Forecasts
 PB Aviation, Inc. Analysis

The fleet mix for international operations is presented in **Table 3.4-4**. Initially, service will be provided to Canada and Mexico with A320-type of equipment. As the market grows, 757s will be used in place of the Airbus equipment. The 757 and A320 equipment will be switched over time to accommodate needs for additional seats and/or frequencies. The forecast assumes that European service will be provided with 767s.

TABLE 3.4-4

Sacramento International Airport

INTERNATIONAL FLEET MIX

<u>Equipment</u>	<u>Seats</u>	<u>Annual Operations</u>			
		<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
A320	148	1,456	728	1,456	2,912
757	180		728	728	
767	250			<u>520</u>	<u>1,040</u>
	Total	1,456	1,456	2,704	3,952
<u>Equipment</u>	<u>Seats</u>	<u>Distribution by Equipment Type</u>			
		<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
A320	148	100.0%	50.0%	53.8%	73.7%
757	180	0.0%	50.0%	26.9%	0.0%
767	250	<u>0.0%</u>	<u>0.0%</u>	<u>19.2%</u>	<u>26.3%</u>
	Total	100.0%	100.0%	100.0%	100.0%

Source: PB Aviation, Inc. Analysis

3.4.2 Regional Carrier Operations and Fleet Mix

Regional carrier operations are presented in **Table 3.4-5**. Regional flight activity has fluctuated over the period analyzed just as passenger traffic levels have. Operations reached a peak in 1990, and have declined sharply in the last few years as independent operators dropped out of markets, and as United’s commuter partner has become the only regional carrier serving Sacramento. While operations grew at an average annual rate of 9 percent 1984 through 1990, they have declined significantly since then.

TABLE 3.4-5

Sacramento International Airport

REGIONAL CARRIER OPERATIONS

<u>Year</u>	<u>Operations</u>	<u>Departures</u>	<u>Enplanements Per Departure</u>
1984	19,231	9,616	8.7
1985	18,481	9,241	9.3
1986	22,080	11,040	10.5
1987	26,972	13,486	10.8
1988	28,460	14,230	13.0
1989	27,987	13,994	14.2
1990	32,318	16,159	12.7
1991	27,996	13,998	12.8
1992	24,024	12,012	11.8
1993	24,165	12,082	12.6
1994	24,375	12,187	13.6
1995	24,398	12,199	12.1
1996	24,065	12,032	13.2
1997	24,192	12,096	12.7
1998	17,510	8,755	13.1
1999	16,458	8,229	16.6
Forecasts			
2005	17,900	9,000	18.4
2010	18,700	9,300	19.9
2015	20,800	10,400	20.9
2020	21,000	10,500	21.9
Average Annual Growth Rates			
1984-1990	9.0%	9.0%	0.7
1990-1995	(5.5)%	(5.5)%	(0.1)
1995-1999	(9.4)%	(9.4)%	1.1
1999-2010	1.1%	1.1%	0.3
2010-2020	1.2%	1.2%	0.2

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
PB Aviation, Inc. Analysis
FAA Aerospace Forecasts

Operations for regional carriers were forecast using the regional passenger forecast as a base, and by making assumptions regarding expectations for regional passenger enplanements per departure. As Table 3.4-5 indicates, enplanements per departure were around 10 in the mid-1980s, have held in the low teens 1988 through 1998, and increased to 16.6 in 1999. As explained in the passenger forecast section, Sacramento is not expected to experience the influx of service on regional jets that many parts of the country are forecasting. Therefore, enplanements per departure are projected to grow annually at 0.3 through 2010, and 0.2 per year after that. This results in 21.9 enplaned regional passengers per departure by 2020.

Applying these assumptions regarding enplanements per departure to the regional passenger forecast produces the regional carrier operations projections in Table 3.4-5. Operations are expected to grow slightly over 1 percent annually throughout the forecast period.

Currently, all operations are on Embraer 120 Brasilia 30-seat aircraft. Over the forecast period it is expected that some 50-seat regional jet service will be introduced, but the bulk of the activity will still be 30-seat type of aircraft. The specific fleet mix is presented in **Table 3.4-6**. Regional jets are expected to provide over 16 percent of the operations by 2020.

TABLE 3.4-6

Sacramento International Airport

REGIONAL CARRIER FLEET MIX

<u>Equipment</u>	<u>Seats</u>	<u>Annual Operations</u>			
		<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
EM2	30	17,938	17,269	17,895	17,498
CRJ	50	0	1,382	2,863	3,500
Total		17,938	18,650	20,759	20,998

<u>Equipment</u>	<u>Seats</u>	<u>Distribution by Equipment Type</u>			
		<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
EM2	30	100.0%	92.6%	86.2%	83.3%
CRJ	50	0.0%	7.4%	13.8%	16.7%
Total		100.0%	100.0%	100.0%	100.0%

Source: Official Airline Guide
PB Aviation, Inc. Analysis

3.4.3 Charter Carrier Operations and Fleet Mix

Charter operations are presented in **Table 3.4-7**. It is assumed that any charter activity undertaken will have at least a 70 percent load factor on 148-seat type of equipment, such as an A320. This implies 104 passengers per departure. Applying this projection to the chartered passenger forecast produces 67 operations annually. This is

<i>TABLE 3.4-7</i>			
<i>Sacramento International Airport</i>			
<i>CHARTER OPERATIONS</i>			
	<u>Enplanements</u>	<u>Estimated</u>	
		<u>Per Departure</u>	<u>Operations</u>
1995	10,484	104	202
1996	9,142	104	176
1997	1,552	104	30
1998	2,436	104	47
1999	2,733	104	53
<u>Forecasts</u>			
2005	3,500	104	67
2010	3,500	104	67
2015	3,500	104	67
2020	3,500	104	67
<u>Average Annual Growth Rates</u>			
1995-1999	(28.5)%	0.0%	(28.5)%
1999-2010	2.3%	0.0%	2.3%
2010-2020	0.0%	0.0%	0.0%

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
PB Aviation, Inc. Analysis

approximately 34 departures per year, or fewer than one per week. The A320 is assumed to be the equipment type for all charter activities.

3.4.4 All Cargo Operations and Fleet Mix

Operations by all-cargo aircraft were forecast using freight volume as a base, and projecting all-cargo share of the total volume and all-cargo pounds per operation based upon historical relationships. **Table 3.4-8** presents the history and forecast of these operations. As discussed in the section on freight volume projections, a significant portion of freight activity was relocated to Mather over the last few years. Thus, operations of all-cargo operations declined steadily after 1997. However, even through this transition, all-cargo carriers continued to carry a similar share of total freight at the Airport, approximately 89 percent. It was forecast that all-cargo carriers would continue

to carry this share of total freight at the Airport. In 1998 and 1999, as cargo operations at the Airport settled down to the carriers who were going to remain there, pounds of freight carried per operation stabilized near the level experienced prior to the shift in activity. For the forecast, a pounds-per-operation of the average of 1998 and 1999, which was 9,297 pounds, was used. Maintaining this steady level implies that feeders will continue to support Fed Ex and DHL operations at the Airport in a steady relationship of feeder-to-large aircraft.

The results of applying these assumptions to the total volume of forecast freight poundage are presented in Table 3.4-8. Operations of all-cargo aircraft are projected to grow 7.7 percent per year through 2010 and 3.8 percent annually thereafter.

TABLE 3.4-8

Sacramento International Airport

ALL-CARGO OPERATIONS

	Total Freight Pounds	All Cargo Carriers			
		Pounds	Percent of Total Freight	Operations	Pounds Per Operation
1995	122,901,917	109,207,151	88.9%	10,700	10,206
1996	115,293,449	100,576,439	87.2%	16,491	6,099
1997	132,200,105	117,697,358	89.0%	22,282	5,282
1998	123,061,569	110,008,971	89.4%	10,392	10,586
1999	102,131,390	90,213,221	88.3%	9,734	9,268
Forecasts					
2005	194,887,300	173,449,600	89.0%	17,500	9,927
2010	244,532,100	217,633,500	89.0%	21,900	9,927
2015	297,932,800	265,160,200	89.0%	26,700	9,927
2020	354,991,100	315,942,100	89.0%	31,800	9,927
Average Annual Growth Rates					
1995-1999	(4.5)%	(4.7)%	N/A	(2.3)%	N/A
1999-2010	8.3%	8.3%	N/A	7.7%	N/A
2010-2020	3.8%	3.8%	N/A	3.8%	N/A

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
PB Aviation, Inc. Analysis

The fleet mix for all-cargo carriers is presented in **Table 3.4-9**. Fed Ex is expected to operate DC-10 equipment throughout the forecast period. DHL is assumed to acquire A300-600 freighters by 2010, and to use them exclusively by 2015. The carriers feeding the all-cargo major operators are assumed to continue to operate Cessna, Fairchild (Swearingen) and Shorts equipment. The mix of fleet types fluctuates only slightly as the relationship between feeder flights and large jets is retained consistently throughout the period.

TABLE 3.4-9				
Sacramento International Airport				
CARGO FLEET MIX				
<u>Equipment</u>	<u>Annual Operations</u>			
	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
DC10	1,205	1,497	1,781	1,802
A300-600	0	593	1,781	1,802
727F	603	593	0	-
SWM	4,218	5,021	5,936	7,206
Caravan	10,243	12,443	14,840	18,015
SH6	<u>1,205</u>	<u>1,778</u>	<u>2,374</u>	<u>3,003</u>
Total	17,473	21,924	26,711	31,827
<u>Equipment</u>	<u>Distribution by Equipment Type</u>			
	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
DC10	6.9%	6.8%	6.7%	5.7%
A300-600	0.0%	2.7%	6.7%	5.7%
727F	3.4%	2.7%	0.0%	0.0%
SWM	24.1%	22.9%	22.2%	22.6%
Caravan	58.6%	56.8%	55.6%	56.6%
SH6	<u>6.9%</u>	<u>8.1%</u>	<u>8.9%</u>	<u>9.4%</u>
Total	100.0%	100.0%	100.0%	100.0%

Source: Sacramento County Airport System
 PB Aviation, Inc. Analysis
 FAA Aerospace Forecasts

It is assumed that mail will continue to be carried on the scheduled passenger carriers under contract to the USPS. No separate mail operations are forecast for the Airport.

3.4.5 General Aviation Operations and Fleet Mix

General aviation historical and forecast operations are presented in **Table 3.4-10**. These operations peaked at the Airport in 1988. As was the case with general aviation

<i>TABLE 3.4-10</i>			
<i>Sacramento International Airport</i>			
<i>GENERAL AVIATION OPERATIONS</i>			
<u>Year</u>	<u>Operations</u>		
1984	59,416		
1985	62,515		
1986	70,406		
1987	67,230		
1988	79,596		
1989	78,807		
1990	72,201		
1991	63,318		
1992	69,444		
1993	71,714		
1994	60,616		
1995	61,968		
1996	48,946		
1997	38,873		
1998	39,172		
1999	42,509	31,882	10,627
<u>Forecasts</u>	<u>Total</u>	<u>Itinerant</u>	<u>Local</u>
2005	45,800	34,400	11,400
2010	48,700	36,500	12,200
2015	51,900	38,900	13,000
2020	55,200	41,400	13,800
<u>Average Annual Growth Rates</u>			
1984-1990	3.3%		
1990-1995	(3.0)%		
1995-1999	(9.0)%		
1999-2010	1.3%	1.3%	1.3%
2010-2020	1.3%	1.3%	1.3%

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
 FAA Aerospace Forecasts, 2000-2011
 PB Aviation, Inc. Analysis

throughout the country, activity fell off from that peak as liability issues discouraged this type of activity throughout the country through 1994. However, general aviation activity did not rebound at Sacramento after the 1994 passage of the General Aviation Revitalization Act. It further declined at the Airport after the decision to move activity where possible to Executive Airport.

The operators that remain at Sacramento are operations associated with:

- A Cessna maintenance facility
- An FAA inspection operation based there
- Government activity related to business in the state capital
- Corporate activity located more conveniently to the Airport than to other county airports
- Individual operators whose business is specifically related to the Airport

Over time, it is expected that this level of activity will increase somewhat. This growth will be driven by economic growth in the area. The Cessna operations will increase somewhat as its business grows. FAA activity will increase as general aviation operations throughout the area increase. Economic growth will fuel some growth in corporate and government flights. However, the past history of general aviation activity at the Airport and the policy of discouraging general aviation operations at the Airport that need not necessarily be there will result in a growth rate below that forecast for U.S. general aviation as a whole.

Therefore, general aviation operations at the Airport, as presented in Table 3.4-10, are forecast to grow at 1.25 percent annually, one-half the rate expected by the FAA for U.S. general aviation activity. This assumption results in a general aviation activity level of 55,200 operations in 2020. This is well below the peak level of activity in the late 1980s, but above the operations level observed there now. General aviation operations are split 75 percent itinerant and 25 percent local activity. This split is based on a review of FAA Air Traffic Control records.

The fleet mix for general aviation activity is presented in **Table 3.4-11**. For both itinerant and local activity, single-engine piston activity is growing slightly faster than twin-engine piston. Two-engine jet activity is also growing slightly above the average, taking a slightly greater share of operations by 2020 than in 2005. These growth rates reflect FAA assumptions regarding flight hours and ownership of various general aviation equipment types throughout the forecast period.

TABLE 3.4-11

**Sacramento International Airport
GENERAL AVIATION FLEET MIX**

Equipment Type	Annual Operations - Itinerant / Local Split			
	2005	2010	2015	2020
Itinerant				
Single-Engine Piston	17,423	19,026	20,443	21,440
Twin-Engine Piston	4,480	4,506	4,986	4,986
Turbo-Prop	5,476	6,008	5,983	6,482
Two-Engine Jet	5,974	6,008	6,482	7,479
Three-Engine Jet	498	501	499	499
Helicopter	498	501	499	499
Total Itinerant	34,349	36,550	38,892	41,385
Local				
Single-Engine Piston	5,974	6,335	6,981	7,390
Twin-Engine Piston	1,493	1,462	1,496	1,478
Turbo-Prop	1,493	1,462	1,496	1,971
Two-Engine Jet	1,991	2,437	2,493	2,463
Three-Engine Jet	-	-	-	-
Helicopter	498	487	499	493
Total Local	11,450	12,183	12,964	13,795
Distribution by Equipment Type				
Equipment Type	2005	2010	2015	2020
Itinerant				
Single-Engine Piston	50.7%	52.1%	52.6%	51.8%
Twin-Engine Piston	13.0%	12.3%	12.8%	12.0%
Turbo-Prop	15.9%	16.4%	15.4%	15.7%
Two-Engine Jet	17.4%	16.4%	16.7%	18.1%
Three-Engine Jet	1.4%	1.4%	1.3%	1.2%
Helicopter	1.4%	1.4%	1.3%	1.2%
Total Itinerant	100.0%	100.0%	100.0%	100.0%
Local				
Single-Engine Piston	52.2%	52.0%	53.8%	53.6%
Twin-Engine Piston	13.0%	12.0%	11.5%	10.7%
Turbo-Prop	13.0%	12.0%	11.5%	14.3%
Two-Engine Jet	17.4%	20.0%	19.2%	17.9%
Three-Engine Jet	0.0%	0.0%	0.0%	0.0%
Helicopter	4.3%	4.0%	3.8%	3.6%
Total Local	100.0%	100.0%	100.0%	100.0%
Total Annual Operations				
Equipment Type	2005	2010	2015	2020
Single-Engine Piston	23,397	25,361	27,424	28,830
Twin-Engine Piston	5,974	5,968	6,482	6,464
Turbo-Prop	6,969	7,470	7,479	8,453
Two-Engine Jet	7,965	8,445	8,975	9,942
Three-Engine Jet	498	501	499	499
Helicopter	996	988	997	991
Total	45,798	48,733	51,856	55,179
Distribution by Equipment Type				
Equipment Type	2005	2010	2015	2020
Single-Engine Piston	51.1%	52.0%	52.9%	52.2%
Twin-Engine Piston	13.0%	12.2%	12.5%	11.7%
Turbo-Prop	15.2%	15.3%	14.4%	15.3%
Two-Engine Jet	17.4%	17.3%	17.3%	18.0%
Three-Engine Jet	1.1%	1.0%	1.0%	0.9%
Helicopter	2.2%	2.0%	1.9%	1.8%
Total	100.0%	100.0%	100.0%	100.0%

Source: Sacramento County Airport System
FAA Aerospace Forecasts
PB Aviation, Inc. Analysis

3.4.6 Military Operations and Fleet Mix

Military operations, like general aviation operations, have not been encouraged at the Airport over the last few years. In fact, Airport staff informally requested the military to limit operations at the Airport. Even prior to this policy decision, military activity had declined significantly at the Airport relative to its peak in the late 1980s. Historical and forecast military operations are presented in **Table 3.4-12**. It is expected that some military activity associated with Travis Air Force Base and Beale Air Force Base will continue throughout the forecast period. However, it is not expected that this activity will exceed what is flown at the Airport currently. The forecast assumes 5,000 military operations annually, split 26 percent itinerant and 74 percent local. The local activity is associated with training.

The fleet mix for military operations is presented in **Table 3.4-13**. It is split 30 percent C5s, 30 percent on T38 trainers, and 40 percent KC135 aircraft through 2020. This split is based on discussions with FAA Air Traffic Control personnel at Sacramento.

3.4.7 Summary of Operations and Fleet Mix Projections

A summary of all operations at the Airport is presented in **Table 3.4-14**. It is interesting to note that all types of operations, except major carriers and military, displayed a decline in activity between 1995 and 1999. The forecast assumes that all areas (except military and charter) grow during the forecast period. International operations show the highest percentage growth, coming from no operations in 1999 to an

TABLE 3.4-12

Sacramento International Airport

MILITARY OPERATIONS

<u>Year</u>	<u>Operations</u>		
1984	12,659		
1985	12,029		
1986	15,819		
1987	12,542		
1988	13,388		
1989	8,445		
1990	3,352		
1991	6,318		
1992	4,761		
1993	4,246		
1994	2,669		
1995	5,250		
1996	4,263		
1997	2,973		
1998	4,461		
1999	5,543	1,440	4,103
<u>Forecasts</u>	<u>Total</u>	<u>Itinerant</u>	<u>Local</u>
2005	5,000	1,300	3,700
2010	5,000	1,300	3,700
2015	5,000	1,300	3,700
2020	5,000	1,300	3,700
<u>Average Annual Growth Rates</u>			
1984-1990	(19.9)%		
1990-1995	9.4%		
1995-1999	1.4%		
1999-2010	(0.9)%	(0.9)%	(0.9)%
2010-2020	0.0%	0.0%	0.0%

Source: Sacramento County Airport System
 FAA Aerospace Forecasts, 2000-2011; Long Range 2015,2020,2025
 PB Aviation, Inc. Analysis

TABLE 3.4-13

Sacramento International Airport

MILITARY FLEET MIX

Itinerant				
Annual Operations - Itinerant				
<u>Equipment</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
C5	390	390	390	390
T38	390	390	390	390
KC135	<u>520</u>	<u>520</u>	<u>520</u>	<u>520</u>
Total Itinerant	1,300	1,300	1,300	1,300
Distribution by Equipment Type				
<u>Equipment</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
C5	30.0%	30.0%	30.0%	30.0%
T38	30.0%	30.0%	30.0%	30.0%
KC135	<u>40.0%</u>	<u>40.0%</u>	<u>40.0%</u>	<u>40.0%</u>
Total Itinerant	100.0%	100.0%	100.0%	100.0%
Local				
Annual Operations - Local				
<u>Equipment</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
C5	1,110	1,110	1,110	1,110
T38	1,110	1,110	1,110	1,110
KC135	<u>1,480</u>	<u>1,480</u>	<u>1,480</u>	<u>1,480</u>
Total Local	3,700	3,700	3,700	3,700
Distribution by Equipment Type				
<u>Equipment</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
C5	30.0%	30.0%	30.0%	30.0%
T38	30.0%	30.0%	30.0%	30.0%
KC135	<u>40.0%</u>	<u>40.0%</u>	<u>40.0%</u>	<u>40.0%</u>
Total Local	100.0%	100.0%	100.0%	100.0%
Total				
Total Annual Operations				
<u>Equipment</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
C5	1,500	1,500	1,500	1,500
T38	1,500	1,500	1,500	1,500
KC135	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>
Total	5,000	5,000	5,000	5,000
Distribution by Equipment Type				
<u>Equipment</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
C5	30.0%	30.0%	30.0%	30.0%
T38	30.0%	30.0%	30.0%	30.0%
KC135	<u>40.0%</u>	<u>40.0%</u>	<u>40.0%</u>	<u>40.0%</u>
Total	100.0%	100.0%	100.0%	100.0%

Source: Sacramento County Airport System
PB Aviation, Inc. Analysis

TABLE 3.4-14

**Sacramento International Airport
AIRCRAFT OPERATIONS SUMMARY**

Year	Air Carrier			Total Air Carrier	Charter	Cargo	General		Total
	Domestic		International				Aviation	Military	
	Majors	Regionals							
1984	39,494	19,231		58,725	N/A	N/A	59,416	12,659	130,800
1985	43,892	18,481		62,373	N/A	N/A	62,515	12,029	136,917
1986	53,131	22,080		75,211	N/A	N/A	70,406	15,819	161,436
1987	58,722	26,972		85,694	N/A	N/A	67,230	12,542	165,466
1988	60,211	28,460		88,671	N/A	N/A	79,596	13,388	181,655
1989	55,491	27,987		83,478	N/A	N/A	78,807	8,445	170,730
1990	53,506	32,318		85,824	N/A	N/A	72,201	3,352	161,377
1991	56,977	27,996		84,973	N/A	N/A	63,318	6,318	154,609
1992	65,408	24,024		89,432	N/A	N/A	69,444	4,761	163,637
1993	66,877	24,165		91,042	N/A	N/A	71,714	4,246	167,002
1994	67,041	24,375		91,416	N/A	N/A	60,616	2,669	154,701
1995	76,229	24,398		100,627	202	10,700	61,968	5,250	178,747
1996	78,438	24,065		102,503	176	16,491	48,946	4,263	172,379
1997	79,284	24,192		103,476	30	22,282	38,873	2,973	167,634
1998	79,670	17,510		97,180	47	10,392	39,172	4,461	151,252
1999	81,285	16,458		97,743	53	9,734	42,509	5,543	155,582
Forecasts									
2005	101,100	17,900	1,500	120,500	67	17,500	45,800	5,000	188,800
2010	113,200	18,700	1,500	133,400	67	21,900	48,700	5,000	209,000
2015	131,900	20,800	2,700	155,400	67	26,700	51,900	5,000	239,000
2020	139,700	21,000	4,000	164,700	67	31,800	55,200	5,000	256,800
Average Annual Growth Rates									
1984-1990	5.2%	9.0%		6.5%			3.3%	(19.9)%	3.6%
1990-1995	7.3%	(5.5)%		3.2%			(3.0)%	9.4%	2.1%
1995-1999	1.6%	(9.4)%		(0.7)%	(28.5)%	(2.3)%	(9.0)%	1.4%	(3.4)%
1999-2010	3.1%	1.1%		2.9%	2.3%	7.7%	1.3%	(0.9)%	2.7%
2010-2020	2.1%	1.2%	10.5%	2.1%	0.0%	3.8%	1.3%	0.0%	2.1%

Note: Forecasts rounded to the nearest 100.

Source: Sacramento County Airport System
 FAA Aerospace Forecasts, 2000-2011; Long Range 2015,2020,2025
 PB Aviation, Inc. Analysis

expected 1.5 percent of operations by 2020. Cargo operations are also exhibiting a growth rate faster than average at the Airport. Feeder activity is the primary driver for the cargo operations. Overall, Airport operations are forecast to grow at 2.7 percent per year from 1999 through 2010, and 2.1 percent annually thereafter. From 1984 through 1999, total operations activity at the Airport grew at an average of 1.2 percent annually. The forecast projects double that growth, 2.4 percent per year, from 1999 through 2020. This will occur despite recent moves to shift general aviation, cargo and military activity to other area airports.

The summary of activity by equipment type is presented in **Table 3.4-15**. In 2005 the 737-300, single-engine piston, and EM2 are the largest operators in the fleet. By 2020, the 737-700 and 737-800 take over the load formerly held by the 737-300. The EM2 and single-engine piston aircraft still carry the heaviest operational load in their respective regional and general aviation areas. Also, by 2015 the 767 becomes the largest aircraft in the passenger fleet. The CRJ, 767 and A300-600 are the significant new aircraft types introduced into the fleet over the forecast period.

3.5 PEAK HOUR PROJECTIONS

Peak activity for passengers and operations are presented in this section. These peaks will vary for different elements of activity at the Airport, such as major and regional passenger carriers, cargo activity, and general aviation operations. Each element of activity is discussed in the following sections.

TABLE 3.4-15

Sacramento International Airport

AIRPORT SUMMARY DISTRIBUTION BY EQUIPMENT TYPE

Equipment Type	Annual Operations				Distribution By Equipment Type (%)			
	2005	2010	2015	2020	2005	2010	2015	2020
F28	2,807	1,406			1.5	0.7		
F100	2,106	3,514	4,939	4,915	1.1	1.7	2.1	1.9
737-500	4,913	7,731	7,761	4,915	2.6	3.7	3.2	1.9
737-200	6,317	3,514			3.3	1.7		
737-300	44,216	28,113	9,877		23.4	13.5	4.1	
737-700	10,528	20,382	40,214	47,047	5.6	9.8	16.8	18.3
MD80	4,211	2,108	2,117		2.2	1.0	0.9	
737-400	3,509	5,623	6,350	6,320	1.9	2.7	2.7	2.5
727-200	2,807	2,811			1.5	1.3		
A320	8,541	21,177	34,682	43,004	4.5	10.1	14.5	16.7
737-800	7,720	10,542	18,343	21,066	4.1	5.0	7.7	8.2
757	4,913	7,756	9,900	15,448	2.6	3.7	4.1	6.0
767			520	1,040			0.2	0.4
EM2	17,938	17,269	17,895	17,498	9.5	8.3	7.5	6.8
CRJ		1,382	2,863	3,500		0.7	1.2	1.4
DC10	1,205	1,497	1,781	1,802	0.6	0.7	0.7	0.7
A300-600		593	1,781	1,802		0.3	0.7	0.7
727F	603	593			0.3	0.3		
SWM	4,218	5,021	5,936	7,206	2.2	2.4	2.5	2.8
Caravan	10,243	12,443	14,840	18,015	5.4	6.0	6.2	7.0
SH6	1,205	1,778	2,374	3,003	0.6	0.9	1.0	1.2
Single-Engine Piston	23,397	25,361	27,424	28,830	12.4	12.1	11.5	11.2
Twin-Engine Piston	5,974	5,968	6,482	6,464	3.2	2.9	2.7	2.5
Turbo-Prop	6,969	7,470	7,479	8,453	3.7	3.6	3.1	3.3
Two-Engine Jet	7,965	8,445	8,975	9,942	4.2	4.0	3.8	3.9
Three-Engine Jet	498	501	499	499	0.3	0.2	0.2	0.2
Helicopter	996	988	997	991	0.5	0.5	0.4	0.4
C5	1,500	1,500	1,500	1,500	0.8	0.7	0.6	0.6
T38	1,500	1,500	1,500	1,500	0.8	0.7	0.6	0.6
KC135	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>	<u>1.1</u>	<u>1.0</u>	<u>0.8</u>	<u>0.8</u>
Total	188,798	208,984	239,029	256,762	100%	100%	100%	100%

Source: PB Aviation, Inc. Analysis

3.5.1 Passenger Peaking

In planning airport facilities it is important to identify the times of peak activity and the levels of activity that occur during those time frames. Facilities are designed to accommodate an average day during the peak month, rather than the absolute peak level of activity. Passenger activity on the average day of the peak month, and during the peak hour of activity on that day, is presented in **Table 3.5-1**. The table is discussed in the following sections.

<i>TABLE 3.5-1</i>										
<i>Sacramento International Airport</i>										
<i>PASSENGER PEAKING</i>										
	<u>Average Day of the Peak Month</u>				<u>Peak Hour</u>				<u>Peak Hour (All Years)</u>	
	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>		
<u>Major Domestic</u>										
Enplanements	15,045	17,468	21,102	23,138	1,914	2,106	2,624	2,959	0600-0659	
Deplanements	15,045	17,468	21,102	23,138	1,531	1,830	1,952	2,288	0800-0859	
Originations	14,344	16,619	20,034	21,945	1,825	2,003	2,491	2,806	0600-0659	
Destinations	14,344	16,619	20,034	21,945	1,460	1,741	1,853	2,170	0800-0859	
Connections (EP)	701	849	1,068	1,194	89	102	133	153	0600-0659	
Connections (DP)	701	849	1,068	1,194	71	89	99	118	0800-0859	
<u>Regional Domestic</u>										
Originations	514	578	676	716	69	99	104	109	0800-0900	
Destinations	514	578	676	716	69	99	104	109	0800-0900	
<u>International</u>										
Int'l Flt. Originations	283	329	608	898	148	172	211	250	<u>2005-2010</u>	<u>2015-2020</u>
Int'l Flt. Destinations	283	329	608	898	148	172	211	250	1000-1100	1600-1700
									0900-1000	1300-1400

Source: PB Aviation, Inc. Analysis

3.5.1.1 Major Domestic Passenger Peak

Passenger activity at Sacramento has peaked in June over the last several years. The absolute numbers of passengers in a month appear to be higher in August. However, when the monthly numbers are reduced to passenger volume on an average day of the month, June (with only 30 days) has the higher volume on the average day. June has average 9.36 percent of annual passenger traffic between 1996 and 1999. This percentage of annual traffic, divided by 30 yields an average day in the peak month. This calculation was applied to enplaned and

deplaned passengers, origin and destination passengers, and connecting passengers to yield the exhibits for major domestic passengers in Table 3.5-1, under “Average Day of the Peak Month.”

The peak hour of passenger activity is assumed to coincide with the peak hour of seats arriving and seats departing. The peak hour for departing seats, and enplaned passengers, is 6 AM to 7 AM. The peak hour for arriving seats and deplaning passengers is 8 AM to 9 AM. These seats are assumed to be filled at 25 percent above the average load factor, because we are dealing with a period of peak activity. Originations and destinations are assumed to be the same percentage of peak traffic as they are of total annual traffic. This is also assumed for connections.

The peak hour passenger enplanements are 12 to 13 percent of the average day, peak month total passenger traffic. Deplanement peak hour passengers are 9 to 10 percent of the day’s passengers.

3.5.1.2 Regional Domestic Passenger Peak

Regional traffic peaks at 8 AM to 9 AM for both arrivals and departures. It is assumed that there are no connections among regional flights. Calculating peak hour passengers for regional traffic follows the same methodology as that used for major carriers. Peak hour regional passengers are 13 to 17 percent of average day, peak month total regional passengers.

3.5.1.3 International Passenger Peak

The peak month for international traffic is assumed to carry the same share of traffic as does the domestic peak, 9.36 percent. In the forecast, international departing flights range from two daily in 2020 up to six per day in 2020. Given the difference in destinations and time zones, it is assumed that the peak for this activity will be one departure and one arrival. Further, it is assumed that in 2005, operating 148-seat aircraft, these aircraft will be full during the peak period. In 2010 and later, when there is more capacity available, it is assumed that these aircraft will be filled 25 percent above the average load factor. The results of this analysis are found in Table 3.5-1. Given the destinations offered in international service and the time zone changes, the peak hour is assumed to change when European service on 767s is introduced in 2015. For Mexico and Canada service, the peak departure time is 10 AM to 11 AM, and the peak arrival time is 9 AM to 10 AM. For the European service, the peak departure time is 4 PM to 5 PM, and the peak arrival hour is 1 PM to 2 PM.

3.5.2 Operations Peaking

Various types of activity at the Airport exhibit different peaking characteristics. Passenger and cargo activity, for example, peak in different months and at different times of the day. It is important to identify each of the peaks individually, as each activity element requires its unique set of facilities, as well as some shared facilities.

The peaks for all activity elements are summarized in **Table 3.5-2**, and each element is discussed further in the following sections. It is important to note that operations in the peak hour or on the average day of the peak month are not additive across different activity elements. This is because the peak months differ among elements, and the peak hours differ even within elements. For example, the peak hour for total operations for major domestic activity in 2005 is 28 operations. This is the highest level reached for combined activity in a single hour. However, this is not the sum of the peak hour arrivals and peak hour departures, because the arrivals and departures peak in different hours.

3.5.2.1 Major Domestic Carrier

Major domestic carrier operations peak in June. On the average day in June, forecast operations range from 288 in 2005 to 398 by 2020. The hourly distribution of activity for major domestic carriers is presented in **Table 3.5-3**. Throughout the forecast period, arrivals peak at 8 AM to 9 AM, and departures peak at 6 AM to 7 AM. Total operations peak in the 8 AM to 9 AM hour. Peaking percentages hover around 9 percent for arrivals, 11 percent for departures, and 9 percent for total operations.

The peak departure time of 6 AM to 7 AM probably relates to Sacramento's location on the west coast in the Pacific time zone. Travelers to the east beyond California get an early start so as not to lose too much of the day in more eastern time zones, which are one to three hours ahead. Similarly, flights arriving in the peak 8 AM to 9 AM arrival hour have left more eastern time zones at the start of their respective business days. Travelers to California can leave home at the start of their day and still arrive in California at the start of the west coast's day.

TABLE 3.5-2

Sacramento International Airport

OPERATIONS PEAKING

	Peak Month	Average Day Peak Month				Peak Hour			
		2005	2010	2015	2020	2005	2010	2015	2020
Major Domestic	June								
Arrival		144	161	187	199	13	15	16	18
Departure		<u>144</u>	<u>161</u>	<u>187</u>	<u>199</u>	16	17	20	22
Total		288	322	374	398	28	31	34	36
Regional Domestic	June								
Arrival		25	27	29	30	3	4	4	4
Departure		<u>25</u>	<u>27</u>	<u>29</u>	<u>30</u>	3	4	4	4
Total		50	54	58	60	6	8	8	8
International	June								
Arrival		2	2	4	6	1	1	1	1
Departure		<u>2</u>	<u>2</u>	<u>4</u>	<u>6</u>	1	1	1	1
Total		4	4	8	12	2	2	2	2
Cargo	October								
Arrival		29	37	45	53	8	9	10	11
Departure		<u>29</u>	<u>37</u>	<u>45</u>	<u>53</u>	10	11	12	13
Total		58	74	90	106	12	15	17	20
General Aviation	May								
Local									
Arrival		23	25	26	28	4	5	5	5
Departure		<u>23</u>	<u>25</u>	<u>26</u>	<u>28</u>	4	5	5	5
Total		46	50	52	56	8	10	10	10
Itinerant									
Arrival		69	73	78	83	6	6	6	7
Departure		<u>69</u>	<u>73</u>	<u>78</u>	<u>83</u>	6	7	7	7
Total		138	146	156	166	11	12	12	13
Military	November								
Local									
Arrival		9	9	9	9	2	2	2	2
Departure		<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	2	2	2	2
Total		18	18	18	18	4	4	4	4
Itinerant									
Arrival		3	3	3	3	1	1	1	1
Departure		<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	1	1	1	1
Total		6	6	6	6	2	2	2	2
Charter	June								
Arrival		1	1	1	1	1	1	1	1
Departure		<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	1	1	1	1
Total		2	2	2	2	1	1	1	1

Note: The peaks for the various types of operations as shown here are not additive. As the Table indicates, different activity elements peak in different months. Therefore, a sum across monthly peaks is not valid. It is also not valid to sum arrivals and departures for hourly peaks, as the peak arrival hour frequently differs from the peak departure hour.

Source: PB Aviation, Inc. Analysis

TABLE 3.5-3

Sacramento International Airport

24-HOUR PEAKING ACTIVITY
MAJOR DOMESTIC OPERATIONS

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059		2			2			2			2	
0100 - 0159												
0200 - 0259	1			1			1			1		
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659	1	16	17	1	17	18	1	20	21	1	22	23
0700 - 0759	8	7	15	9	7	16	11	10	21	11	11	22
0800 - 0859	13	15	28	15	16	31	16	18	34	18	18	36
0900 - 0959	10	10	20	11	12	23	13	14	27	14	15	29
1000 - 1059	9	10	19	11	11	22	13	13	26	13	14	27
1100 - 1159	9	3	12	11	7	18	11	8	19	11	9	20
1200 - 1259	8	14	22	8	14	22	8	16	24	8	16	24
1300 - 1359	7	9	16	8	9	17	9	10	19	9	10	19
1400 - 1459	6	8	14	8	9	17	12	9	21	12	9	21
1500 - 1559	7	2	9	9	4	13	11	9	20	12	9	21
1600 - 1659	7	7	14	9	8	17	10	9	19	13	9	22
1700 - 1759	9	11	20	9	13	22	13	13	26	13	17	30
1800 - 1859	6	7	13	7	9	16	7	10	17	7	10	17
1900 - 1959	8	5	13	8	5	13	8	8	16	9	8	17
2000 - 2059	11	8	19	11	8	19	11	8	19	11	9	20
2100 - 2159	9	6	15	9	6	15	10	6	16	13	6	19
2200 - 2259	10	2	12	10	2	12	11	2	13	12	3	15
2300 - 2359	5	2	7	6	2	8	11	2	13	11	2	13
Total	144	144	288	161	161	322	187	187	374	199	199	398
Peak Hour	13	16	28	15	17	31	16	20	34	18	22	36
Peak Percent	9.0%	11.1%	9.7%	9.3%	10.6%	9.6%	8.6%	10.7%	9.1%	9.0%	11.1%	9.0%

Source: PB Aviation, Inc. Analysis

3.5.2.2 Regional Domestic Carrier

Regional activity also peaks in the month of June. As Table 3.5-2 indicated, operations in the forecast for the average day, peak month for regionals grow from 25 in 2005 to 30 in 2020. Hourly activity for the regional carriers is presented in Table 3.5-4. The peak arrival and departure hour for regionals is 8 AM to 9 AM. There is also a peak in activity later in the day in the 7 PM to 8 PM evening hour. Arrivals and departures for regional carriers during the peak hours range from three to four operations throughout the forecast period. Because regional activity out of Sacramento confines itself to the Pacific time zone, there is no need to start as early as the major carriers do. Also, there is more opportunity for activity later in the day for the same reason.

TABLE 3.5-4

Sacramento International Airport

24-HOUR PEAKING ACTIVITY
REGIONAL DOMESTIC OPERATIONS

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059												
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659		2			2			3			3	
0700 - 0759	2	1	3	2	1	3	2	1	3	2	1	3
0800 - 0859	3	3	6	4	4	8	4	4	8	4	4	8
0900 - 0959	1	2	3	1	2	3	1	2	3	1	2	3
1000 - 1059	2	2	4	2	2	4	2	2	4	3	3	6
1100 - 1159	1	1	2	1	1	2	1	1	2	1	1	2
1200 - 1259	1	1	2	1	1	2	1	1	2	1	1	2
1300 - 1359	1	1	2	1	1	2	1	1	2	1	1	2
1400 - 1459	1	1	2	1	1	2	1	1	2	1	1	2
1500 - 1559	1	1	2	1	1	2	1	1	2	1	1	2
1600 - 1659	2	2	4	2	2	4	3	2	5	3	2	5
1700 - 1759	1	1	2	1	1	2	1	2	3	1	2	3
1800 - 1859	2	2	4	3	2	5	3	2	5	3	2	5
1900 - 1959	3	3	6	3	4	7	3	4	7	3	4	7
2000 - 2059	1	1	2	1	1	2	1	1	2	1	1	2
2100 - 2159	1	1	2	1	1	2	2	1	3	2	1	3
2200 - 2259	2			2			2			2		
2300 - 2359												
Total	25	25	50	27	27	54	29	29	58	30	30	60
Peak Hour	3	3	6	4	4	8	4	4	8	4	4	8
Peak Percent	12.0%	12.0%	12.0%	14.8%	14.8%	14.8%	13.8%	13.8%	13.8%	13.3%	13.3%	13.3%

Source: PB Aviation, Inc. Analysis

3.5.2.3 International Carrier

International traffic is also assumed to peak in June. Operations peaking listed in Table 3.5-2 indicates that international activity goes from two departures daily in 2005 up to a peak of six departures in 2020. Because of the variety of destinations served internationally, operations do not overlap in the schedule period. Flights leaving for Mexico have a different timing pattern than those going to Canada. Both of these destinations have different patterns than European flights. The hourly distribution of international operations is presented in Table 3.5-5.

TABLE 3.5-5

Sacramento International Airport

**24-HOUR PEAKING ACTIVITY
INTERNATIONAL OPERATIONS**

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059												
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659												
0700 - 0759											1	1
0800 - 0859												
0900 - 0959	1		1	1		1	1		1	1		1
1000 - 1059	1	1	2	1	1	2	1	1	2	1	1	2
1100 - 1159										1		1
1200 - 1259		1	1		1	1		1	1		1	1
1300 - 1359							1		1	1		1
1400 - 1459												
1500 - 1559							1		1	1	1	2
1600 - 1659								1	1		1	1
1700 - 1759								1	1		1	1
1800 - 1859												
1900 - 1959												
2000 - 2059										1		1
2100 - 2159												
2200 - 2259												
2300 - 2359												
Total	2	2	4	2	2	4	4	4	8	6	6	12
Peak Hour	1	1	2	1	1	2	1	1	2	1	1	2
Peak Percent	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	25.0%	25.0%	25.0%	16.7%	16.7%	16.7%

Source: PB Aviation, Inc. Analysis

3.5.2.4 Cargo Carrier

The peak month for cargo operations is October. This coincides with retailer build-up for the November/December holiday season. October cargo operations account for 10.4 percent of annual operations. As seen in Table 3.5-2, cargo operations in October are expected to grow from 58 in 2005 to 106 in 2020.

The hourly distribution of cargo activity is presented in Table 3.5-6. Cargo has an hourly pattern very different from passenger operations. Cargo flights arrive bringing in freight in the late afternoon hours, with arrivals peaking in the 5 PM to 6 PM time frame. Departures then peak in the 6 AM to 7 AM hour as the feeder carriers for DHL and Fed Ex disperse to deliver outbound cargo. While passenger operations have 10 to 15 percent of their operations in their peak hours, cargo peak hours represent over 20 percent of their activity. It is difficult for time-

sensitive cargo carriers to spread their operations out throughout the day due to the design of their product offering. Customers wish to send their outgoing packages as late as possible in the day; hence, the late afternoon arrivals of freight-bearing feeder flights. Then, the customers want the earliest possible delivery of their packages in the morning; hence the bank of early outbound cargo feeder flights.

TABLE 3.5-6

Sacramento International Airport

24-HOUR PEAKING ACTIVITY

CARGO OPERATIONS

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059	1	1	2				1	1	2			
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559		4	4		4	4		5	5		6	6
0600 - 0659	2	10	12	4	11	15	5	12	17	7	13	20
0700 - 0759		9	9		10	10		10	10	2	11	13
0800 - 0859	2	1	3	4	3	7	5	6	11	5	7	12
0900 - 0959		4	4		6	6	1	6	7	2	7	9
1000 - 1059												
1100 - 1159												
1200 - 1259												
1300 - 1359												
1400 - 1459	2		2	4		4	4		4	6		6
1500 - 1559												
1600 - 1659	6		6	7		7	8		8	8		8
1700 - 1759	8		8	9		9	10		10	11		11
1800 - 1859	8		8	8		8	9	2	11	9	3	12
1900 - 1959	1	1	2	1	3	4	3	4	7	3	6	9
2000 - 2059												
2100 - 2159												
2200 - 2259												
2300 - 2359												
Total	30	30	60	37	37	74	46	46	92	53	53	106
Peak Hour	8	10	12	9	11	15	10	12	17	11	13	20
Peak Percent	26.7%	33.3%	20.0%	24.3%	29.7%	20.3%	21.7%	26.1%	18.5%	20.8%	24.5%	18.9%

Source: PB Aviation, Inc. Analysis

3.5.2.5 General Aviation

General aviation activity peaks in May with 12.42 percent of operations occurring during that month. In Table 3.5-2, peak operations for general aviation activity are distinguished between itinerant and local operations. Local operations, which tend to be training flights, maintenance checks and peak more

severely than do itinerant operations. The hourly distribution of activity for itinerant operations is presented in **Table 3.5-7**, and local operations are shown in **Table 3.5-8**. In Table 3.5-7, the peak hour for arrivals, 3 PM to 4 PM, has 8 to 9 percent of the daily arrival operations. Departures peak in the 2 PM to 3 PM hour with a similar level of concentration. However, the local operations behave in a different manner. Local operations have “simultaneous” arrivals and departures. That is, the aircraft usually lands and takes off in the same motion. Thus, the arrival and departure times are virtually the same. Table 3.5-8 indicates that they peak in the 3 PM to 4 PM hour, concentrating 18 to 20 percent of their activity during that time.

TABLE 3.5-7												
Sacramento International Airport												
24-HOUR PEAKING ACTIVITY												
GENERAL AVIATION - ITINERANT OPERATIONS												
Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059	1		1	1		1	1		1	1		1
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559	1		1	1		1	2		2	2		2
0600 - 0659	3	5	8	4	5	9	4	6	10	5	5	10
0700 - 0759	3	5	8	4	5	9	4	5	9	5	5	10
0800 - 0859	4	4	8	4	5	9	4	5	9	5	5	10
0900 - 0959	4	3	7	4	3	7	3	3	6	4	4	8
1000 - 1059	5	4	9	5	5	10	5	5	10	5	6	11
1100 - 1159	4	4	8	5	4	9	5	4	9	5	5	10
1200 - 1259	4	4	8	4	4	8	5	4	9	5	5	10
1300 - 1359	4	4	8	4	4	8	5	4	9	5	4	9
1400 - 1459	5	6	11	5	7	12	5	7	12	5	7	12
1500 - 1559	6	5	11	6	5	11	6	6	12	7	6	13
1600 - 1659	5	5	10	5	5	10	6	5	11	6	5	11
1700 - 1759	5	5	10	5	5	10	6	5	11	6	6	12
1800 - 1859	5	5	10	6	5	11	6	6	12	6	7	13
1900 - 1959	4	3	7	4	3	7	4	5	9	4	5	9
2000 - 2059	2	3	5	2	3	5	3	3	6	3	3	6
2100 - 2159	2	2	4	2	3	5	2	3	5	2	3	5
2200 - 2259	1	2	3	1	2	3	1	2	3	1	2	3
2300 - 2359	1		1	1		1	1		1	1		1
Total	69	69	138	73	73	146	78	78	156	83	83	166
Peak Hour	6	6	11	6	7	12	6	7	12	7	7	13
Peak Percent	8.7%	8.7%	8.0%	8.2%	9.6%	8.2%	7.7%	9.0%	7.7%	8.4%	8.4%	7.8%

Source: PB Aviation, Inc. Analysis

TABLE 3.5-8

Sacramento International Airport

**24-HOUR PEAKING ACTIVITY
GENERAL AVIATION - LOCAL OPERATIONS**

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059												
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659												
0700 - 0759										1	1	2
0800 - 0859	1	1	2	1	1	2	1	1	2	1	1	2
0900 - 0959	2	2	4	2	2	4	2	2	4	2	2	4
1000 - 1059	3	3	6	3	3	6	4	4	8	4	4	8
1100 - 1159	3	3	6	3	3	6	3	3	6	3	3	6
1200 - 1259	1	1	2	1	1	2	1	1	2	1	1	2
1300 - 1359	1	1	2	2	2	4	2	2	4	2	2	4
1400 - 1459	4	4	8	4	4	8	4	4	8	5	5	10
1500 - 1559	4	4	8	5	5	10	5	5	10	5	5	10
1600 - 1659	2	2	4	2	2	4	2	2	4	2	2	4
1700 - 1759	1	1	2	1	1	2	1	1	2	1	1	2
1800 - 1859	1	1	2	1	1	2	1	1	2	1	1	2
1900 - 1959												
2000 - 2059												
2100 - 2159												
2200 - 2259												
2300 - 2359												
Total	23	23	46	25	25	50	26	26	52	28	28	56
Peak Hour	4	4	8	5	5	10	5	5	10	5	5	10
Peak Percent	17.4%	17.4%	17.4%	20.0%	20.0%	20.0%	19.2%	19.2%	19.2%	17.9%	17.9%	17.9%

Source: PB Aviation, Inc. Analysis

3.5.2.6 Other (Charter, Military)

As discussed earlier, charter activity is expected to amount to only 37 departures annually, or fewer than one per week. **Table 3.5-9** indicates that, when it operates, it is assumed that charter activity will arrive in the 8 AM to 9 AM time frame, and depart noon to 1 PM. This is assumed because the arrival time matches that of the major domestic carriers. The departure is later than the major domestic peak because it is assumed that turn times for a charter carrier are longer than those for scheduled carriers.

Military activity is separated into itinerant and local operations. Both types of activity peak in November, with 12.13 percent of itinerant operations occurring in that month, and 15.11 percent of local. Table 3.5-2 indicated that the

average day of the peak month will have 18 local operations and six itinerant. **Tables 3.5-10** and **3.5-11** present hourly activity for the itinerant and local military operations, respectively. The itinerant operations display no peaking, and the local activity peaks at 11 AM to noon and 2 PM to 3 PM with each hour seeing two “departures” and two “arrivals.” As with the general aviation local activity, there is no distinctive arrival and departure period for these operations.

TABLE 3.5-9
Sacramento International Airport
24-HOUR PEAKING ACTIVITY
CHARTER OPERATIONS

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059												
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659												
0700 - 0759												
0800 - 0859	1		1	1		1	1		1	1		1
0900 - 0959												
1000 - 1059												
1100 - 1159												
1200 - 1259		1	1		1	1		1	1		1	1
1300 - 1359												
1400 - 1459												
1500 - 1559												
1600 - 1659												
1700 - 1759												
1800 - 1859												
1900 - 1959												
2000 - 2059												
2100 - 2159												
2200 - 2259												
2300 - 2359												
Total	1	1	2	1	1	2	1	1	2	1	1	2
Peak Hour	1	1	1	1	1	1	1	1	1	1	1	1
Peak Percent	100.0%	100.0%	50.0%	100.0%	100.0%	50.0%	100.0%	100.0%	50.0%	100.0%	100.0%	50.0%

Source: PB Aviation, Inc. Analysis

3.5.2.7 Total Peaking

As discussed earlier, and in the note at the bottom of Table 3.5-2, the peaking activities of these elements are not additive because they occur in different months and at different times of the day. However, for planning purposes for the requirements shared by many of these activity elements (runways, airspace, tower support, etc.) it is useful to construct an hourly scenario for a total day indicating what the absolute peak level of activity would be were these activities to coincide. Such an accumulation is presented in **Table 3.5-12**. In this table are summed the individual hourly arrivals and departures for each segment of Airport activity.

TABLE 3.5-10

Sacramento International Airport

**24-HOUR PEAKING ACTIVITY
MILITARY OPERATIONS - ITINERANT**

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059												
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659												
0700 - 0759												
0800 - 0859												
0900 - 0959												
1000 - 1059												
1100 - 1159	1	1	2	1	1	2	1	1	2	1	1	2
1200 - 1259												
1300 - 1359												
1400 - 1459	1	1	2	1	1	2	1	1	2	1	1	2
1500 - 1559												
1600 - 1659	1	1	2	1	1	2	1	1	2	1	1	2
1700 - 1759												
1800 - 1859												
1900 - 1959												
2000 - 2059												
2100 - 2159												
2200 - 2259												
2300 - 2359												
Total	3	3	6	3	3	6	3	3	6	3	3	6
Peak Hour	1	1	2	1	1	2	1	1	2	1	1	2
Peak Percent	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%

Source: PB Aviation, Inc. Analysis

This summary indicates that the peak arrival hour is either 5 PM to 6 PM, or 8 AM to 9 AM. This reflects the influence of major domestic operators and general aviation activity. Departure peaks are consistently in the 6 AM to 7 AM hour, reflecting the combined influence of major domestic carriers and all-cargo carriers.

TABLE 3.5-11

Sacramento International Airport
24-HOUR PEAKING ACTIVITY
MILITARY OPERATIONS - LOCAL

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059												
0100 - 0159												
0200 - 0259												
0300 - 0359												
0400 - 0459												
0500 - 0559												
0600 - 0659												
0700 - 0759												
0800 - 0859												
0900 - 0959	1	1	2	1	1	2	1	1	2	1	1	2
1000 - 1059												
1100 - 1159	2	2	4	2	2	4	2	2	4	2	2	4
1200 - 1259	1	1	2	1	1	2	1	1	2	1	1	2
1300 - 1359	1	1	2	1	1	2	1	1	2	1	1	2
1400 - 1459	2	2	4	2	2	4	2	2	4	2	2	4
1500 - 1559												
1600 - 1659	1	1	2	1	1	2	1	1	2	1	1	2
1700 - 1759	1	1	2	1	1	2	1	1	2	1	1	2
1800 - 1859												
1900 - 1959												
2000 - 2059												
2100 - 2159												
2200 - 2259												
2300 - 2359												
Total	9	9	18	9	9	18	9	9	18	9	9	18
Peak Hour	2	2	4	2	2	4	2	2	4	2	2	4
Peak Percent	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%	22.2%

Source: PB Aviation, Inc. Analysis

3.6 SUMMARY OF PROJECTIONS

In summary, the Airport will continue to be a vibrant, growing base of aviation activity throughout the forecast period. Growth in domestic passenger traffic will come from increased frequencies by the major carriers to existing markets, and the addition of several new non-stop domestic markets as warranted by growing O&D traffic. Regional activity will grow slightly, but not at the rates expected in other parts of the country. The Airport will continue in its role as, primarily, an O&D point, rather than as a hub for significant connecting activity. International

TABLE 3.5-12

Sacramento International Airport

24-HOUR PEAKING ACTIVITY
SUMMARY OF ALL AIRPORT ACTIVITY ELEMENTS

Hour	2005			2010			2015			2020		
	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total	Arr.	Dept.	Total
0000 - 0059	2	3	5	1	2	3	2	3	5	1	2	3
0100 - 0159												
0200 - 0259	1		1	1		1	1		1	1		1
0300 - 0359												
0400 - 0459												
0500 - 0559	1	4	5	1	4	5	2	5	7	2	6	8
0600 - 0659	6	33	39	9	35	44	10	41	51	13	43	56
0700 - 0759	13	22	35	15	23	38	17	26	43	21	30	51
0800 - 0859	24	24	48	29	29	58	31	34	65	34	35	69
0900 - 0959	19	22	41	20	26	46	22	28	50	25	31	56
1000 - 1059	20	20	40	22	22	44	25	25	50	26	28	54
1100 - 1159	20	14	34	23	18	41	23	19	42	24	21	45
1200 - 1259	15	23	38	15	23	38	16	25	41	16	26	42
1300 - 1359	14	16	30	16	17	33	19	18	37	19	18	37
1400 - 1459	21	22	43	25	24	49	29	24	53	32	25	57
1500 - 1559	18	12	30	21	15	36	24	21	45	26	22	48
1600 - 1659	24	18	42	27	19	46	31	21	52	34	21	55
1700 - 1759	25	19	44	26	21	47	32	23	55	33	28	61
1800 - 1859	22	15	37	25	17	42	26	21	47	26	23	49
1900 - 1959	16	12	28	16	15	31	18	21	39	19	23	42
2000 - 2059	14	12	26	14	12	26	15	12	27	16	13	29
2100 - 2159	12	9	21	12	10	22	14	10	24	17	10	27
2200 - 2259	13	4	17	13	4	17	14	4	18	15	5	20
2300 - 2359	6	2	8	7	2	9	12	2	14	12	2	14
Total	306	306	612	338	338	676	383	383	766	412	412	824
Peak Hour	25	33	48	29	35	58	32	41	65	34	43	69
Peak Percent	8.2%	10.8%	7.8%	8.6%	10.4%	8.6%	8.4%	10.7%	8.5%	8.3%	10.4%	8.4%

Source: PB Aviation, Inc. Analysis

service is expected very soon to Mexico and Canada, with service to the United Kingdom and Germany expected in 2015 and beyond.

General aviation operations will grow somewhat at the Airport, even though the Airport will not be the major center of this activity in the Sacramento area. Cessna operations, FAA inspection activity, flights related to government business, and private general aviation flights specifically connected to the Airport will continue to operate at the Airport.

While the operations of many cargo carriers have moved out of the Airport, FedEx, DHL and their related feeders may continue to operate there. These carriers will see significant growth in their cargo volumes and operations throughout the forecast period.

Some military activity will also occur at the Airport.

3.7 ALTERNATIVE FORECAST SCENARIOS

The forecasts presented in this chapter represent expectations for the most likely future at the Airport. For planning purposes, the base forecast will be used. Improvements that are recommended in the Master Plan Study will be phased to occur on an activity-driven basis. That is, an action will be recommended based upon reaching an activity level, rather than reaching a certain date. As with any forecast, if the factors underlying it evolve differently than assumed in the projections, actual activity levels may evolve differently than estimated. This section reviews some of the factors influencing the forecast that might unfold in the future differently than assumed. The potential impacts of this on enplanements, operations and cargo activity are discussed.

Eight different scenarios were analyzed. These scenarios were constructed in conversation with Airport staff who are aware of the uncertainties most likely to affect the forecasts. The scenarios analyzed are:

- North Bay Diversion
- Enhanced Commuter Network
- Expanded Major Hub Service
- Southwest High Growth
- Southwest Low Growth
- Slower Economic Growth
- E-Commerce Driven Expanded Freight Role
- Further Migration to Mather

Each is discussed in detail in the following sections.

3.7.1 North Bay Diversion

Due to ever-increasing traffic congestion between San Francisco and the Napa/Sonoma area, there is growing potential for increased diversion of Napa/Sonoma passenger traffic from San Francisco International Airport to the Airport. The base forecast takes this into account to the extent that it has happened over the last several years. However, given the possibility that such diversion may continue to increase beyond what has happened historically, the impact of this growing diversion on the forecast was estimated.

In a survey conducted by San Francisco International Airport in 1999, it was estimated that 1.7 percent of its traffic comes from Napa County and 2.8 percent comes from Sonoma County. Given San Francisco's traffic base, traffic from Sonoma and Napa counties translates into almost 600,00 enplanements annually. This scenario assumes that 30 percent of this traffic could be diverted to Sacramento. Passengers traveling to destinations not served non-stop by Sacramento would not be diverted. These assumptions lead to the following impact on 1999 enplanements at the Airport. Refer to **Table 3.7-1** below.

<i>TABLE 3.7-1</i>			
<i>NORTH BAY ENPLANEMENT DIVERSION ASSUMPTIONS</i>			
County	Percent of San Francisco Traffic	San Francisco Enplanements	Sacramento Enplanements at 30% Diversion
Napa	1.7%	225,899	67,770
Sonoma	2.8%	372,069	111,621
Total	4.5%	597,968	179,390

Source: San Francisco International Airport
PB Aviation, Inc. Analysis

These enplanements were assumed to grow from 1999 through 2020 at the same rate as enplanements in the base forecast. The operations impact of these diverted enplanements was estimated assuming the base forecast of enplanements per operation. The forecast impact of North Bay Diversion is presented in **Table 3.7-2**. The increase of over 366,000 enplanements in 2020 represents a 4.6 percent increase in overall

enplanements at the Airport. The increase of nearly 7,000 annual operations in 2020 represents an increase of 2.7 percent in total operations at the Airport.

TABLE 3.7-2					
IMPACT OF HIGH AND LOW SCENARIOS					
Scenario	Activity Element	Impact on Base Forecast Activity			
		2005	2010	2015	2020
(1) North Bay Diversion	Enplanements	238,278	276,651	334,208	366,456
	Passenger Operations	4,995	5,592	6,521	6,906
(2) Enhanced Commuter Network	Enplanements	113,880	227,760	341,640	455,520
	Passenger Operations	5,840	11,680	17,520	23,360
(3) Expanded Major Hub Service	Enplanements	85,410	85,410	170,820	170,820
	Passenger Operations	1,460	1,460	2,920	2,920
(4) Southwest High Growth	Enplanements	194,652	224,998	256,337	284,557
	Passenger Operations	4,081	4,548	5,001	5,363
(5) Southwest Low Growth	Enplanements	(178,872)	(206,757)	(235,555)	(261,488)
	Passenger Operations	(3,750)	(4,180)	(4,596)	(4,928)
(6) Slower Economic Growth	Enplanements	(64,062)	(222,518)	(501,443)	(770,867)
	Passenger Operations	(3,058)	(10,144)	(21,943)	(32,419)
	Cargo Operations	<u>(1,595)</u>	<u>(2,284)</u>	<u>(2,772)</u>	<u>(2,970)</u>
	Total Operations	(4,654)	(12,428)	(24,715)	(35,389)
	Freight Lbs.	(15,656,926)	(22,418,036)	(27,203,003)	(29,147,234)
	Mail Lbs.	<u>(2,138,106)</u>	<u>(3,061,401)</u>	<u>(3,714,835)</u>	<u>(3,980,339)</u>
	Total Cargo Lbs.	(17,795,032)	(25,479,438)	(30,917,838)	(33,127,573)
(7) E-Commerce Driven Expanded Role	Freight Lbs.	9,744,362	12,226,602	14,896,640	17,749,556
	Cargo Operations	874	1,096	1,336	1,591
(8) Further Migration To Mather	Freight Lbs.	(104,069,790)	(130,580,113)	(159,096,118)	(189,565,259)
	Cargo Operations	(10,484)	(13,154)	(16,027)	(19,096)

Source: PB Aviation, Inc. Analysis

3.7.2 Enhanced Commuter Network

The base forecast assumes that commuter activity at Sacramento will grow at a rate below the nation as a whole. This assumption is based on the related assumption that the major carriers do not use Sacramento as a hub into which they feed commuter passengers, both originating and connecting. This scenario challenges the assumptions of the base case forecast and assesses the impact of an increase in commuter traffic at the Airport.

The scenario assumes that commuter service will be instituted between Sacramento and Redding, Chico, and Bakersfield in addition to the cities identified in the base forecast. It also assumes that commuter service to Fresno is initiated earlier than in the base forecast. Two factors drove the inclusion of these points in the scenario: all of these cities have had commuter service to Sacramento in the past, and these cities are frequent origin/destination points for general aviation traffic at Sacramento. It was assumed that these cities would receive two departures daily by 2005, growing to eight departures daily by 2020. The cities would be served by 50-seat regional jets, at a 60 percent load factor. The impact on enplanement and operations is presented in Table 3.7-2.

The impact on enplanements relative to the base forecast grows from a 2.2 percent increase in 2005, to a 5.7 percent increase (455,520 passengers) in 2020. Operations increase from 3.1 percent above the base in 2005 to 9.1 percent in 2020. Note that the passenger impact, on a percentage basis, is much lower than the operations impact. That is because the commuter aircraft are much smaller than the average size of all passenger aircraft operating at the Airport, so the passengers carried are fewer than the average enplanements per departure in the base forecast. In the case of operations, a commuter operation counts as one, just as a major carrier operation does.

3.7.3 Expanded Major Hub Service

The current coverage of its hubs by each major carrier is expected to remain stable during the forecast period in the base forecast. This scenario assumes that American Airlines reinstates non-stop service to its Chicago hub and that Delta institutes non-stop service to its Cincinnati hub. Each carrier is assumed to initiate one daily round trip by 2005, on 180-seat size aircraft, at a 65 percent load factor. This service level is projected to grow to two daily trips by 2015 and throughout the forecast period. The impact of this activity on enplanements and operations is presented in Table 3.7-2. This is an increase of 2.1 percent in enplanements in 2020 relative to the base forecast, and 1.1 percent in total Airport operations.

3.7.4 Southwest High Growth

Southwest currently represents approximately 50 percent of the major carrier activity at the Airport. The next most dominant carrier represents less than 20 percent. Given the significance of Southwest's presence, this scenario evaluates the impact of higher growth for Southwest than that embodied in the base forecast.

Southwest grows at just over 5 percent annually 1999-2005 in the base case. In this scenario, this initial growth is increased to 6 percent annually. A reason for such an increase might be the carrier's response to construction potentially planned for Oakland over the next five years. Until this construction is completed, expansion capability at Oakland might be slower than Southwest would like. Thus, there might be higher-than-expected growth at Sacramento as Southwest seeks to maintain its desired presence in the Bay area.⁷ After the Oakland construction is completed, growth of Southwest at Sacramento would revert to that expected in the base forecast. The impact of this activity is presented in Table 3.7-2. Airport enplanements are increased approximately 3.7 percent over the base forecast, and operations increase 2 percent.

3.7.5 Southwest Low Growth

Given the influence of Southwest on Airport activity, a low-growth scenario was also hypothesized for the carrier. In conversations with Southwest representatives, it appeared unlikely that such a situation would materialize. Nevertheless, such a possibility was formulated and evaluated. As mentioned earlier, the carrier is projected to grow over 5 percent annually from 2000 through 2005 in the base forecast. This is higher than the 3.1 percent per year growth seen by Southwest at Sacramento from 1995 through 1999. For the Southwest low growth scenario, it was assumed that this 3.1 percent rate experienced recently will continued from 1999 through 2005. The results of such an assumption are presented in Table 3.7-2. This would reduce enplanements by 3.5 percent over the base forecast, and total Airport operations by 2 percent.

3.7.6 Slower Economic Growth

Both passenger and cargo activity in the base forecast are projected as a function of socio-economic variables. A scenario was hypothesized in which economic growth was lower than what is embodied in the base case. This scenario does not project an economic recession, but rather more moderate growth throughout the forecast period. Reviewing various forecasts of economic activity that were used by the FAA to prepare the nation's aviation forecast indicated that there was a range of approximately 10 percent among a variety of socio-economic forecasts. Therefore, this scenario was defined as one in which the growth rate of the economic variables in the forecast was 10 percent below the growth rate in the base case.

The passenger forecast was based on per capita personal income (PCPI). The growth rate of PCPI for the 1999 to 2020 period was reduced by 10 percent, and enplanements were projected using this lower estimation in the forecast equation. The operations impact was estimated using the enplanements per departure embodied in the

base forecast. The resulting impacts on passenger traffic and operations are presented in Table 3.7-2.

Slower growth in the economy would also have a negative impact on cargo at the Airport. The freight and mail impacts were assessed separately. Both projections in the base forecast were a function of retail sales. The growth rate in the projection of this variable was reduced 10 percent and the elements of cargo were forecast using this lower estimate in the equations. The results of this are presented in Table 3.7-2. Cargo operations were reduced for the freight impact using the pounds per cargo operation embodied in the base forecast. There was no reduction in operations due to the reduced mail projection because there are no mail-only operations in the base forecast. All mail is assumed to be carried in the belly of passenger aircraft.

The scenario of slower growth in the economy results in a reduction in enplanement activity of just under 10 percent, or 770,867 enplanements, by 2020. Cargo activity is 8 percent below the base case forecast by 2020. Total operations at the Airport would be 14 percent, 35,389 annual operations, below the base forecast in this scenario by 2020.

3.7.7 E-Commerce Driven Expanded Freight Role

The area feeding freight to the Airport has the potential to grow faster than expected in the base forecast. Factors such as expanded e-commerce types of activity, direct manufacturer-to-customer shipping, and other evolutions in the internet and air freight areas could increase activity beyond the base case forecast. If stronger growth than expected occurs in the Yolo area of the I-5 corridor, and/or along the Roseville and Rocklin area of the I-80 corridor, there could be more freight activity at the Airport than projected in the base forecast. Such a spurt in freight volumes might cause cargo carriers at Sacramento to expand the role of operations beyond what is foreseen in the base forecast. This would cause an increase in cargo volume and operations. Such an increase in volume and operations might cause changes in the role Sacramento plays in the

strategy of a cargo carrier at Sacramento not considered in the base forecast. A carrier might choose to use Sacramento as a maintenance center for aircraft and/or ground vehicles. It could also use Sacramento service to carry freight spilling over from other major area airports in Oakland, San Francisco or San Jose.

Such possibilities are assumed in this scenario. Some of this activity is embodied in the base forecast, to the extent that it has already occurred in recent years. In conversations with the freight carriers at the Airport, it appeared that some of the growth in a scenario such as this would be accommodated at Sacramento. However, if such growth were very high, it might be accommodated at facilities other than Sacramento. Therefore, in this scenario, it was assumed that freight volumes would increase 5 percent above the base forecast. Any growth more than 5 percent above the base forecast was assumed to be accommodated elsewhere. The increased volume was estimated to impact cargo operations at the same pounds per operation used in the base forecast.

Table 3.7-2 presents the impact of this scenario on freight volume and operations. This increase in freight would increase total cargo (freight and mail) by just over 4 percent, and total Airport operations by 0.5 percent.

3.7.8 Further Migration to Mather

One significant uncertainty in the base case cargo forecast is the long-range intentions of the major cargo operators still operating at the Airport. Discussions with the document cargo carrier at the Airport over recent years have considered their operating exclusively at the Airport, exclusively at Mather, or splitting their operation between the two facilities. The base forecast assumes that they will remain exclusively at the Airport as they are today. This scenario envisions a case where this major cargo operator will shift the bulk of its operations to Mather, leaving a small portion of it at the Airport.

The scenario assumes that the dominant cargo operator will move 75 percent of its volume to Mather by 2005, and thereafter. Remaining at the Airport would be all

mail, major passenger carrier freight, and the operations of the other cargo operator at the Airport today. This scenario results in a significant reduction in cargo volume at Sacramento, as indicated in Table 3.7-2. The tonnage leaving the Airport relative to the base forecast represents approximately 45 percent of total cargo volume. Total Airport operations would be reduced just over 7 percent by the departure of this cargo activity.

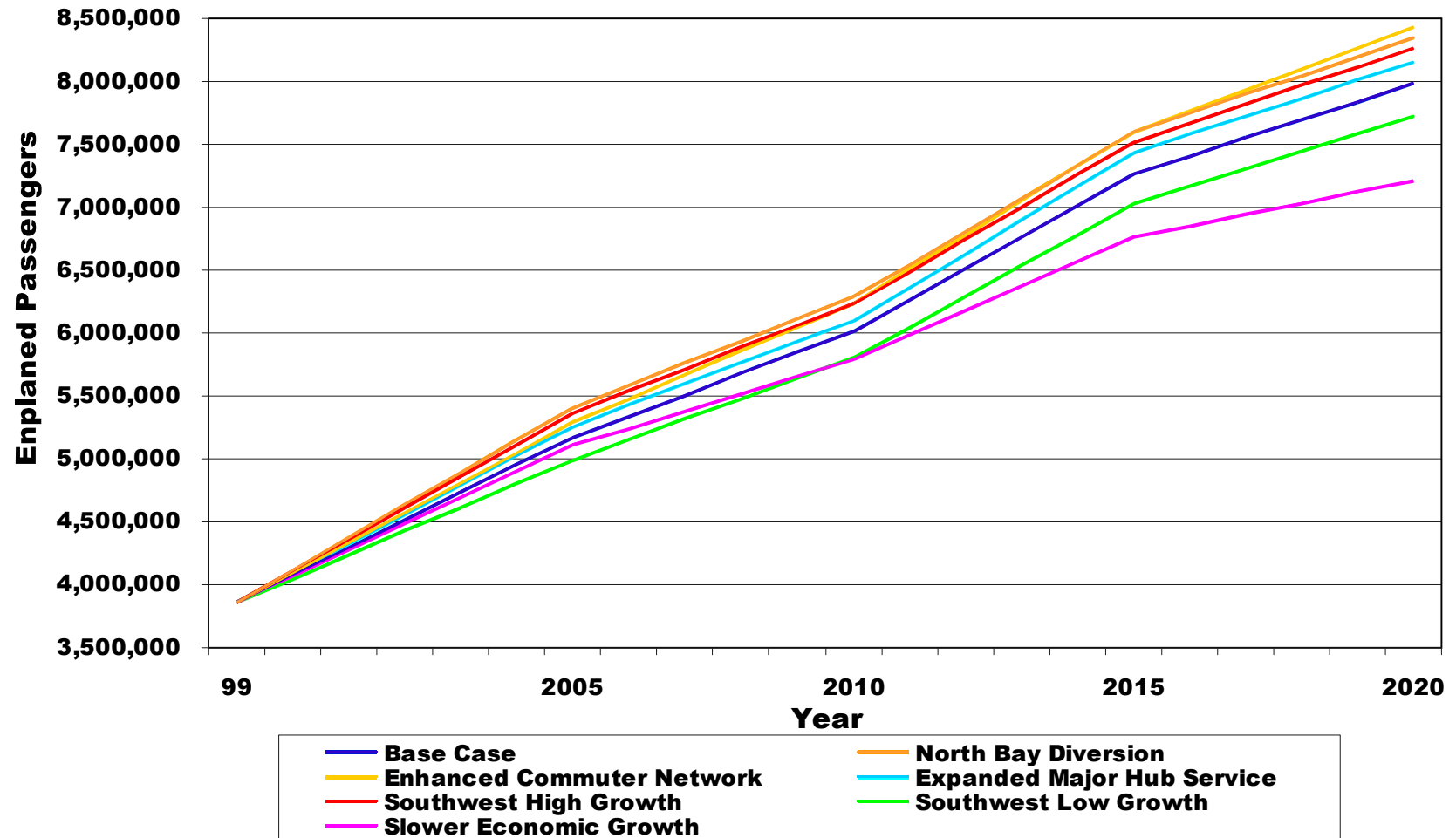
3.7.9 Summary of Scenarios

The impacts of the scenarios hypothesized are summarized in **Exhibit 3.7-1** (Enplanements), **Exhibit 3.7-2** (Cargo) and **Exhibit 3.7-3** (Operations). These exhibits convey a sense of the range of possibilities of activity levels for Sacramento.

Exhibit 3.7-1 indicates a range of possible levels for passenger enplanements. If the economy does grow slowly, enplanements could be as low as only 7.2 million by 2020. If commuter activity increases rapidly, enplanements could reach 8.4 million. The range of cargo volumes displayed in Exhibit 3.7-2 goes from a 2020 high of 437 million pounds to a low of 229 million pounds. Cargo represents the element about which there is the most uncertainty, and which has the widest range of potential outcomes. Operations in Exhibit 3.7-3 range from a 2020 possible high of 280,000, to a low of 221,000. As with passengers, these two extremes are driven by the behavior of commuter carriers and the growth of the economy.

For any of these elements, combinations of scenarios could conspire to exceed any of these ranges. The base forecast is the most likely outcome for activity at the Airport, and plans will be developed based on these activity levels.

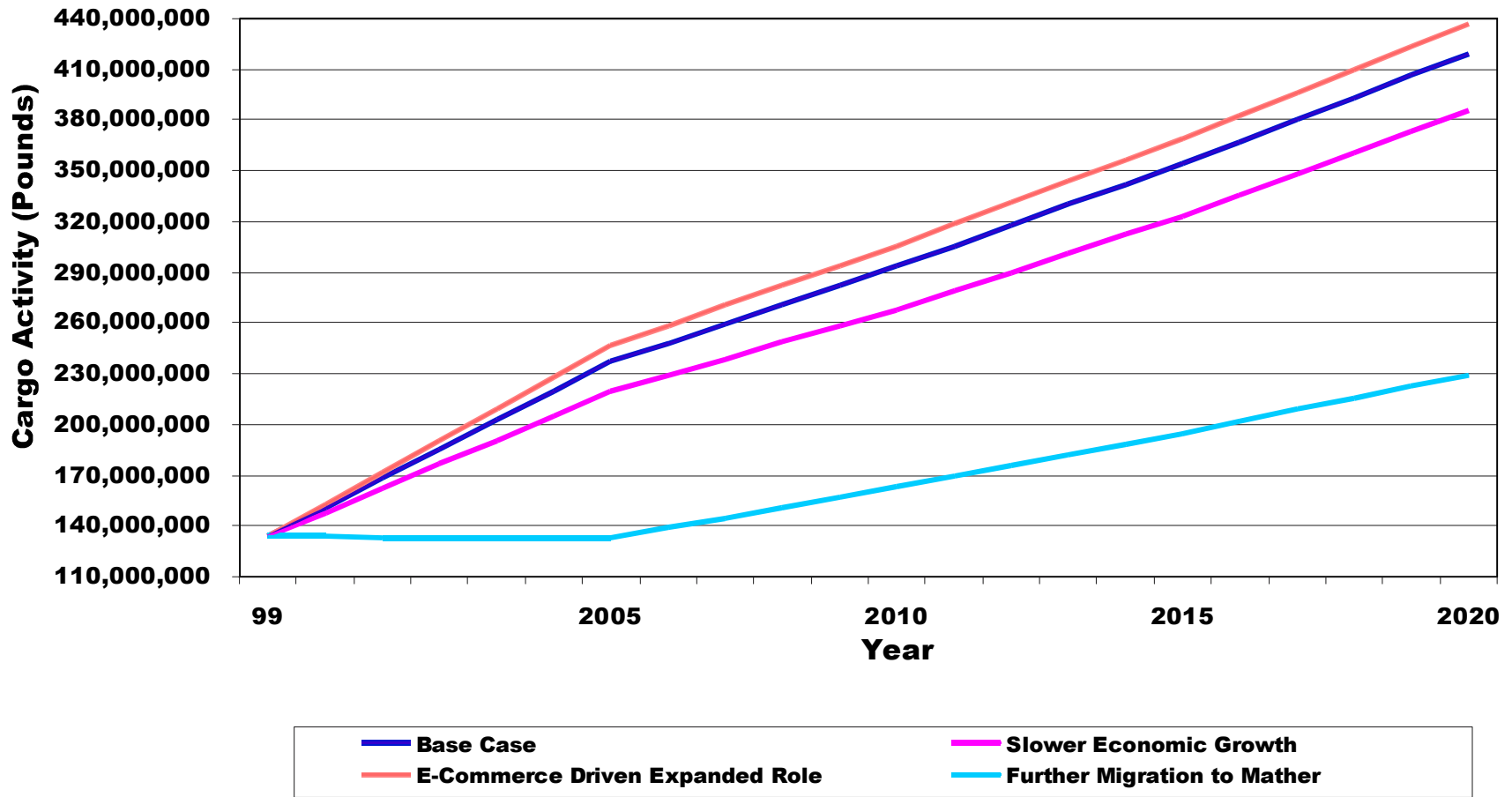
3-79



Sacramento International Airport
Master Plan Study

ENPLANEMENT FORECAST SCENARIOS

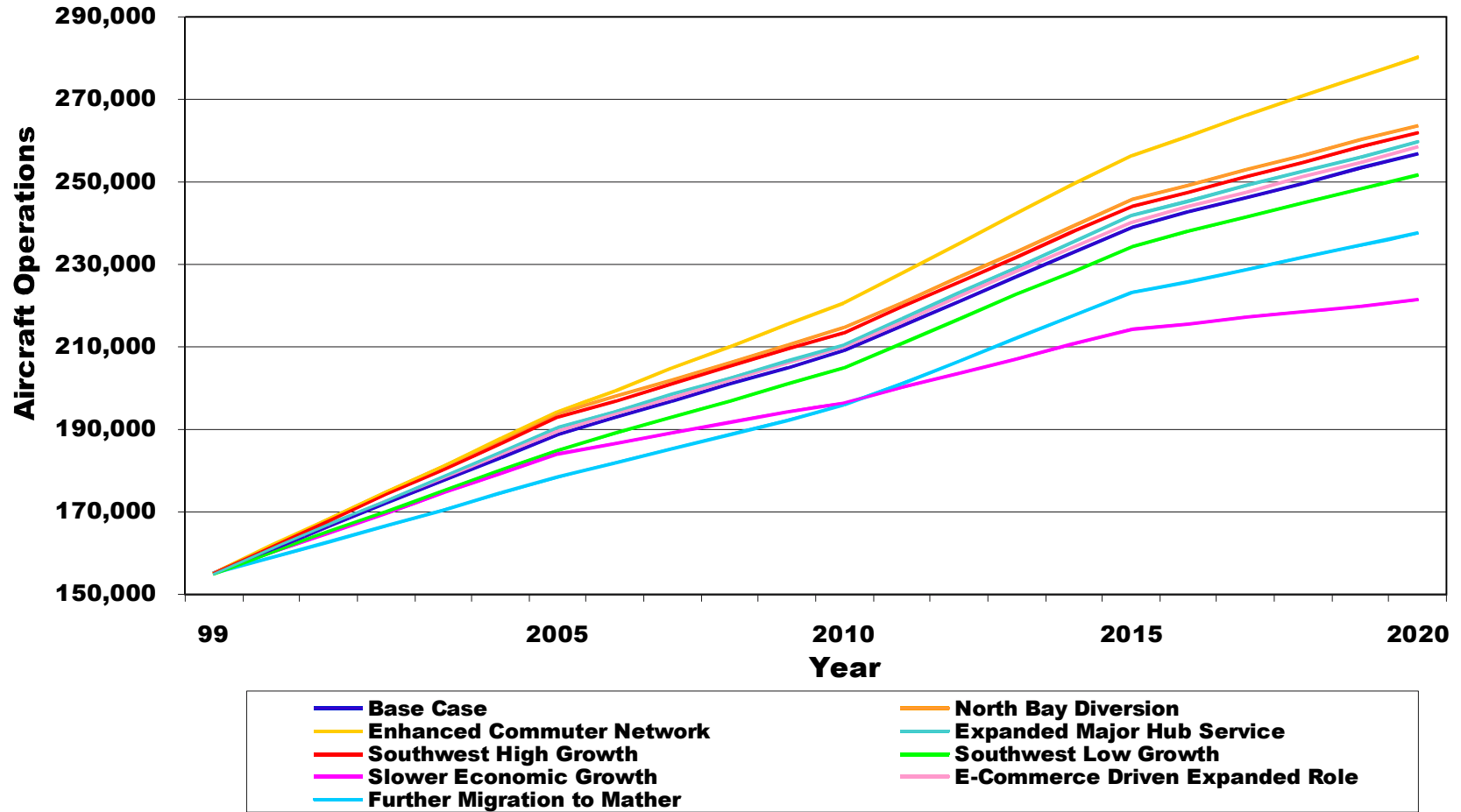
EXHIBIT
3.7-1



Sacramento International Airport
Master Plan Study

CARGO FORECAST SCENARIOS

EXHIBIT
3.7-2



Sacramento International Airport
Master Plan Study

OPERATIONS FORECAST SCENARIOS

EXHIBIT
3.7-3

ENDNOTES

¹ A Major Carrier is one that flies aircraft of more than 30 seats. This definition is evolving as 50- and 70-seat regional jets come on-line. Majors will then be those that fly aircraft of more than 70 seats. The current "Major" carriers at the Airport are Southwest, United, America West, Delta, Alaska, American, Northwest, TWA, Horizon, and Continental.

² A "Regional Carrier" is one that flies 30 seat aircraft, or 50-70 seat regional jets. Regional carriers sometimes operate under their own names, and sometimes under the names of major carriers with whom they are affiliated, through code-share or ownership. Currently, Skywest operates as a United regional affiliate at the Airport.

³ Load Factor refers to the percentage of seats that are occupied by a passenger. If an aircraft has 150 seats, and it is carrying 100 passengers, the load factor is 100/150, or 66.7 percent. If there were 15,000 seats per day that fly out of the Airport, there were 11,500 daily passengers, the Airport's load factor for that day would be 11,500/15,000, or 76.7 percent.

⁴ Woods&Poole Economics Data has population data similar to that in the SACOG databases. Average annual growth in the SACOG forecasts for population and employment was 0.3% higher than in the Woods & Poole data.

⁵ For example: The one-way fare from Sacramento to Las Vegas might be \$65, and the distance is 400 miles. \$65 spread over 400 miles produces a yield of 16.25 cents per mile for this market/fare combination. Similarly, the one-way fare to Atlanta is \$250, and the non-stop distance is 2,100 miles. \$250 spread over 2,100 miles is 11.91 cents per mile. Thus, yield normalizes the fare for the distance involved.

⁶ Subsequent to the preparation of the forecasts, Delta Air Lines announced its plans to begin service to JFK on June 1, 2001.

⁷ Subsequent to the preparation of the forecasts, Southwest Airlines relocated two flights from San Francisco International Airport to Sacramento illustrating its interest in using Sacramento as an alternative to San Francisco.