CHAPTER 8: CAPACITY ANALYSIS

Existing capacity at Washington airports was compared to both current and forecast levels of aviation demand in the state

A capacity analysis was conducted in LATS to measure how well the existing facilities and components associated with Washington airports accommodate aviation activity in the state. In Phase I of LATS, existing airport capacity in Washington was first measured against current levels of aviation demand. Then in Phase II of the study, existing airport capacity in Washington was measured against forecast levels of aviation demand, allowing us to identify potential capacity constraints and/or shortfall across the state through 2030.

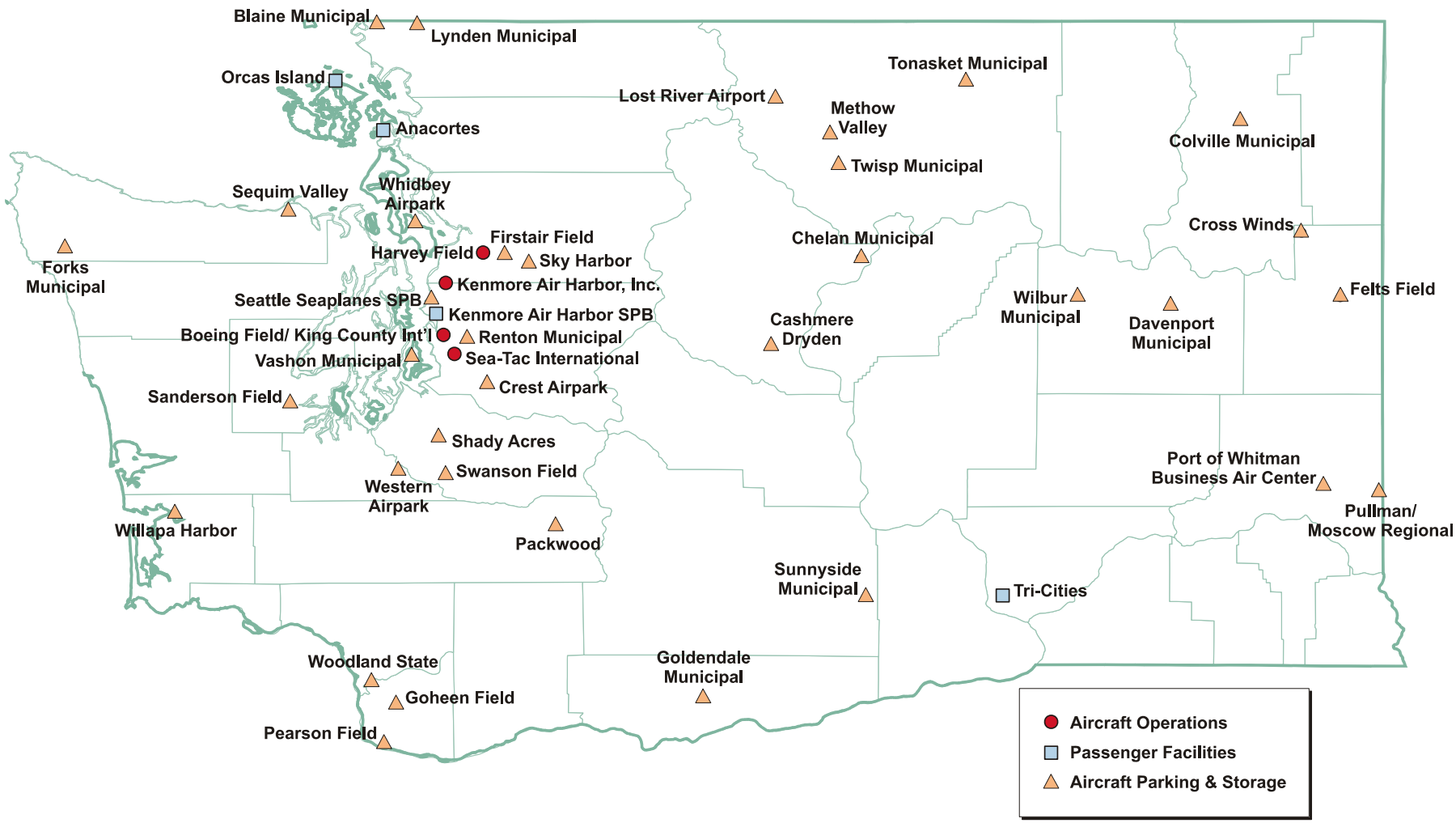
Five types of airport capacity were examined as part of the LATS capacity analysis:

- **Airfield Capacity:** the ability of an airport's runway system to accommodate take-offs and landings without experiencing delays.
- **Commercial Airline Passengers:** the ability of an airport terminal to accommodate airline passengers with adequate space for ticketing, security, etc.
- **Air Cargo:** the ability of an airport to accommodate processing of air cargo tonnage using existing facilities.
- **Aircraft Storage and Parking:** the ability of an airport to accommodate storage of based and transient aircraft in tie-downs and hangars.
- **Airspace System:** the ability of available airspace to safely accommodate aircraft in transit between airports.

A number of Washington airports are expected to experience either airfield, passenger terminal, or aircraft storage constraints by 2030

A number of airports across Washington are expected to experience either airfield, passenger terminal, or aircraft storage capacity constraints by 2030. These airports are shown in Exhibit 7-1 and identified in the capacity discussions following.

Exhibit 8-1: Washington Airports Expected to Approach or Exceed 100% Capacity by 2030



Note: Sea-Tac International and Kenmore Air Harbor Inc. are also constrained in both Passenger Facilities and Aircraft Storage; Boeing Field and Orcas Island are also constrained in Aircraft Storage

Airfield Capacity

Why is it Important?

The airfield capacity of an airport, also known as its operations capacity, measures the number of aircraft operations that can be accommodated by the airport's runway/taxiway system without incurring unacceptable levels of congestion or delay. For this analysis, the annual operations capacity or Annual Service Volume (ASV) of the airport was used as the basis for evaluation.

When operations exceed existing airfield capacity, delays can potentially result in higher costs for airlines and airports, increased environmental impacts, and loss of state system capacity as a whole

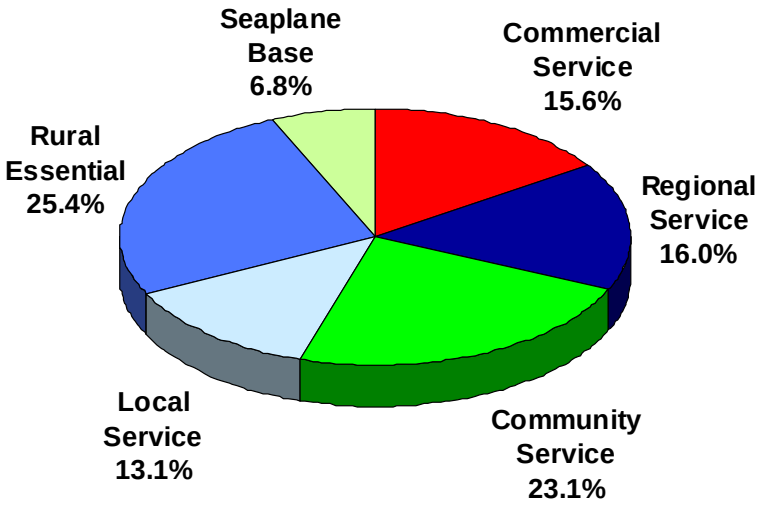
While it is possible for an airport to operate beyond its calculated ASV, aircraft delays will increase as the number of operations rise above the ASV. As delays grow, so do the operating costs of the airlines and aircraft owners, as well as the costs for airport operators. Environmental impacts can also increase, with increased delays leading to increased air and noise pollution due to aircraft waiting to take off or land. Finally, there are potential repercussions for the state airport system capacity as a whole when any airport within the system suffers significant delays.

Serving Current Demand

The public use airports that contribute to statewide operations capacity range widely in size and role. Commercial Service and Regional Service airports are typically capable of handling operations by high performance aircraft (regional/corporate jets and turboprops), while Community Service airports typically handle medium to high performance aircraft. Local Service and Rural Essential airports accommodate a range of small general aviation aircraft operations. Seaplane Bases only handle seaplane operations. See Chapter 2 for further discussion of the Washington airport classification.

A breakdown of 2005 statewide operations capacity in Washington by airport service classification is presented in Exhibit 8-2 on the following page. Rural Essential airports and Community Service airports currently account for the largest portions of state system capacity at 25 percent and 23 percent respectively. Commercial Service airports and Regional Service airports together represent 32 percent or approximately one third of statewide capacity only.

Exhibit 8-2: Current State System Capacity by Airport Service Classification



In 2005, aircraft operations in the state utilized less than 15 percent of overall state operations capacity

Aircraft operations in the state in 2005 utilized less than 15 percent of overall state operations capacity. As shown in Exhibit 8-3 below, the highest utilization was associated with the Commercial Service and Regional Service airports, where 2005 operations represented 37% and 31% of overall capacity respectively. Operations at other airport classifications represented less than 10% of overall operations capacity.

Exhibit 8-3: 2005 Operations as Percent of Current Capacity by Airport Service Classification

State Airport Classification	Annual Service Volume	2005 Operations	2005 Operations as % of ASV
Commercial Service	3,937,300	1,442,500	36.6%
Regional Service	4,048,400	1,258,400	31.1%
Community Service	5,824,200	500,100	8.6%
Local Service	3,297,500	77,200	2.3%
Rural Essential	6,424,300	361,600	5.6%
Seaplane Base	1,786,300	55,700	3.1%
Total System	**25,261,700**	**3,695,400**	**14.6%**

A summary of 2005 operations as percent of operations capacity by RTPO is also presented in Exhibit 8-4. The highest utilization is associated with Puget Sound (36% of overall capacity) and Spokane (22%).

Exhibit 8-4: 2005 Operations as Percent of Current Capacity by RTPO

RTPO	Annual Service Volume	2005 Operations	2005 Operations as % of ASV
Benton-Franklin-Walla Walla	1,386,500	195,700	14.1%
Northeast Washington	943,000	27,900	3.0%
North Central Washington	2,466,800	163,000	6.6%
Palouse	1,138,000	59,100	5.2%
Peninsula	1,495,000	173,400	11.6%
Puget Sound Regional Council	4,973,000	1,796,800	36.1%
Quad County	3,480,500	296,100	8.5%
Other (San Juan Isl.)	1,288,000	132,400	10.3%
Skagit/Island	1,420,000	119,600	8.4%
Spokane	916,500	201,500	22.0%
Southwest Washington (RTC)	1,335,800	130,600	9.8%
Southwest Washington (RTPO)	2,055,500	126,000	6.1%
Thurston	747,500	124,400	16.6%
Whatcom	1,035,000	100,900	9.7%
Yakima Valley	580,800	48,000	8.3%
Total State	**25,261,700**	**3,695,400**	**14.6%**

While current operations utilize a small percentage of overall state and RTPO operations capacity, operations and demand are not uniformly distributed among all airports. Airports located in and around the major population and economic centers of Washington, for example, experience the greatest demand. Individual airports may face capacity constraints, while other airports have significant excess capacity, a typical dynamic in all states.

Current operations exceed 60 percent of airport operations capacity at six individual airports in Puget Sound

The Phase I analysis identified six Washington airports where 2005 operations exceeded 60 percent of the airport ASV. The FAA recommends that planning for additional capacity at an airport be initiated when airport operations reach 60 percent of airport capacity. These six airports are listed in Exhibit 8-5 on the following page. All six airports are located in the congested Puget Sound region.

Exhibit 8-5: Washington Airports Over 60 Percent Operations Capacity as of 2005

Airport Name	Annual Service Volume	2005 Operations	2005 Operations as % of ASV
Kenmore Air Harbor, Inc.	56,250	57,000	101.0%
Sea-Tac International	533,041	346,744	65.0%
Boeing Field/King County Int'l	380,000	251,856	66.0%
Auburn Municipal	231,000	143,540	62.0%
Harvey Field	230,000	139,160	61.0%
Crest Airpark	146,250	240,000	61.0%

Serving Future Demand

In 2005, aircraft operations in the state utilized less than 15 percent of overall state operations capacity

Overall operations demand in Washington is forecast to increase from 14.6 percent of statewide capacity in 2005 to 22.5 percent of statewide capacity in 2030. The greatest operations demand will still be associated with the Commercial Service and Regional Service airports, as shown in Exhibit 8-6. By 2030, utilization of overall operations capacity at Commercial Service airports and Regional Service airports will reach 63 percent and 46 percent respectively..

Exhibit 8-6: 2005 vs. 2030 Demand by Service Classification

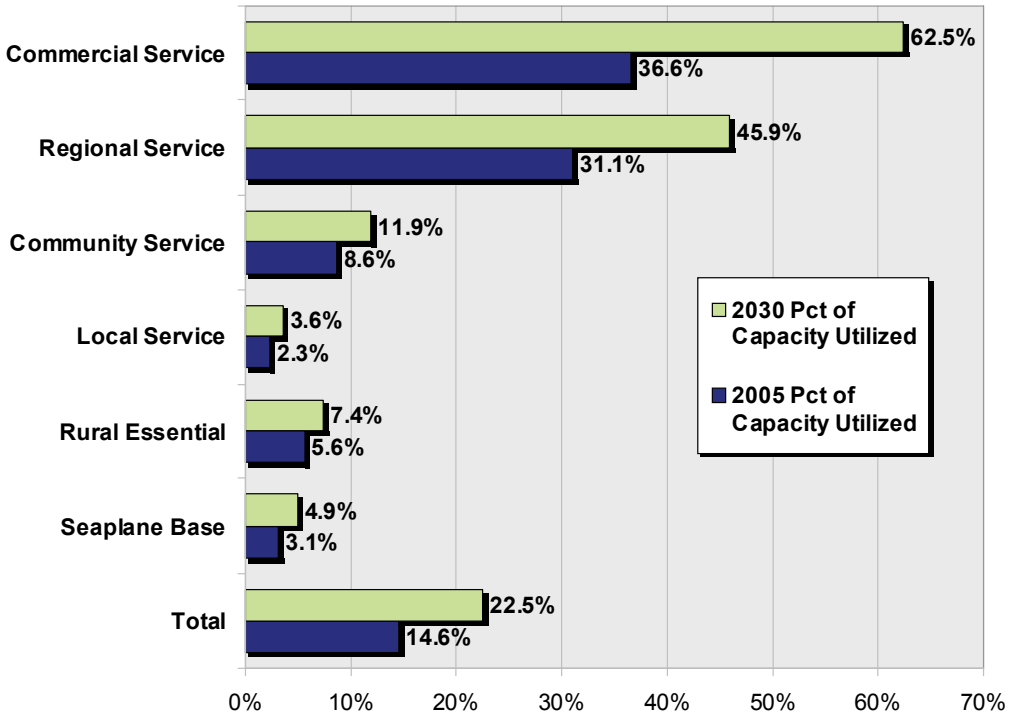


Exhibit 8-7 below summarizes the anticipated changes in operations and capacity utilization between 2005 and 2030 by RTPO. In 2030, operations demand in the Puget Sound RTPO is expected to approach 60 percent of existing operations capacity.

Exhibit 8-7: 2030 Operations Distribution by RTPO

RTPO	Annual Service Volume	2005 Operations	2030 Operations	2005 Operations as % of ASV	2030 Operations as % of ASV
Benton-Franklin-Walla Walla	1,386,500	195,700	264,700	14.1%	19.1%
Northeast Washington	943,000	27,900	44,100	3.0%	4.7%
North Central Washington	2,466,800	163,000	237,400	6.6%	9.6%
Palouse	1,138,000	59,100	68,800	5.2%	6.0%
Peninsula	1,495,000	173,400	242,100	11.6%	16.2%
Puget Sound Regional Council	4,973,000	1,796,800	2,850,300	36.1%	57.3%
Quad County	3,480,500	296,100	407,500	8.5%	11.7%
Other (San Juan Isl.)	1,288,000	132,400	310,500	10.3%	24.1%
Skagit/Island	1,420,000	119,600	165,700	8.4%	11.7%
Spokane	916,500	201,500	299,500	22.0%	32.7%
Southwest Washington (RTC)	1,335,800	130,600	204,200	9.8%	15.3%
Southwest Washington (RTPO)	2,055,500	126,000	172,600	6.1%	8.4%
Thurston	747,500	124,400	212,300	16.6%	28.4%
Whatcom	1,035,000	100,900	156,600	9.7%	15.1%
Yakima Valley	580,800	48,000	57,600	8.3%	9.9%
Total State	**25,261,700**	**3,695,400**	**5,693,900**	**14.6%**	**22.5%**

While future aircraft operations activity remains well below the capacity of the aviation system when viewed from a statewide or regional perspective, capacity constraints affect individual airports where demand is concentrated. Capacity constraints are expected to emerge at twelve airports in Washington by 2030, as shown in Exhibit 8-8 on the following page and discussed below.

Four airports – all located within the Puget Sound Region – are expected to exceed their operational capacity by 2030

Four airports in Washington State are anticipated to exceed 100 percent of their operating capacity by 2030. All four airports are located in the Puget Sound region. The four airports include:

- Seattle-Tacoma International[24]
- Boeing Field
- Harvey Field

[24] In regards to Sea-Tac International, recent trends including higher passenger load factors and an "upgauging" of aircraft size indicate that the airport may now reach its capacity limits beyond 2030. Nevertheless, the airport is still expected to be approaching its capacity limits during the study timeframe, and strategies need to be developed to accommodate future growth in underlying demand.

- Kenmore Air Harbor Inc.

Eight additional airports are expected to reach 60% capacity and will need to initiate planning for adding capacity

In addition, eight airports across the state are expected to reach or exceed 60 percent of operations capacity by 2030 – the activity threshold at which planning for adding capacity should commence. The eight airports include:

- Arlington Municipal
- Auburn Municipal
- Crest Airpark
- Friday Harbor
- Kenmore Air Harbor SPB
- Paine Field
- Olympia
- Spokane International

Exhibit 8-8: Airports with Anticipated Constraints in Operations Capacity by 2030

Airport	Operations Capacity (ASC)	2005 Demand	2005 Utilization	2030 Demand	2030 Utilization
Airports Exceeding 100 Percent Capacity by 2030					
Kenmore Air Harbor, Inc.	56,300	57,000	101%	83,300	148%
Boeing Field/King County Int'l	380,000	251,900	66%	549,200	145%
Sea-Tac International	533,000	346,700	65%	633,600	119%
Harvey Field	230,000	139,200	61%	237,600	103%
Airports Exceeding 60 Percent Capacity by 2030					
Arlington Municipal	270,000	148,500	55%	227,200	84%
Kenmore Air Harbor SPB	60,000	31,200	52%	46,700	78%
Auburn Municipal	231,000	143,500	62%	169,900	74%
Olympia	230,000	89,500	39%	170,800	74%
Friday Harbor	138,000	65,500	47%	98,500	71%
Spokane International	215,000	91,400	42%	151,300	70%
Crest Airpark	240,000	146,300	61%	162,500	68%
Snohomish County/Paine Field	316,200	150,400	48%	199,800	63%

The State will implement a forecast tracking system to monitor actual activity levels at Sea-Tac and other Washington airports compared with the LATS forecasts

Regarding Sea-Tac, while forecasts place the timeframe of Sea-Tac reaching its practical airfield capacity limit of 550,000 operations in approximately 2024, current economic conditions and recent trends at the airport indicate that Sea-Tac may reach airfield capacity beyond the 2030 planning horizon. To account for the inevitable uncertainty surrounding long-term forecasts of aviation activity, the State is implementing a forecast tracking system and will monitor how actual levels of aviation activity at Sea-Tac and other Washington airports compare with the LATS forecasts on an ongoing basis.

The primary capacity issue in Washington is the concentration of demand in the Puget Sound regions

The concentration of demand in the Puget Sound region in Washington constitutes the primary capacity issue for the state. Nine airports within Puget Sound are expected to either approach or exceed their operations capacity by 2030, including the two busiest airports in the state, Sea-Tac and Boeing Field. The number of airports in the region anticipated to experience capacity constraints limits the options for managing demand. Methods such as traffic redistribution or demand management are more difficult when all airports in the system are nearing capacity.

Passenger Terminal Capacity

Why is it Important?

Passenger terminal capacity was measured by the number of passengers that can be processed through an airport's terminal facilities during peak periods of activity while maintaining an acceptable level of service and convenience for each passenger. Terminal capacity takes into account all facilities required to move passengers from curb front to aircraft and gauges the minimum recommended terminal building area needed to accommodate the anticipated demand.

When passenger levels exceed terminal peak hour capacity, congestion occurs and processing times and costs increase

When passenger levels at airports exceed their passenger terminal peak hour capacity, customer service levels decline, passenger crowding and congestion occurs, and passenger processing times increase along with airport and airline operating costs.

Serving Current Demand

In 2005, there were 16 airports statewide reporting at least some level of scheduled passenger service.

The terminal capacity analysis included 16 airports in the state that reported at least some level of scheduled passenger service in 2005. Airports with scheduled passenger service ranged from Seattle-Tacoma International, serving as the Pacific Northwest's gateway to other U.S. and international destinations, to small local airports feeding passengers to larger Washington commercial facilities and seaplane bases.

Existing terminal peak hour capacity and 2005 peak hour passengers for the 16 airports are presented in Exhibit 8-9 on the following page.

Several airports are already at or approaching terminal capacity

Several airports are already operating from terminals that are at or near capacity. Four small commercial service airports currently operate at 100 percent of their terminal peak hour capacity: Anacortes, Orcas Island, Kenmore Air Harbor, Inc., and Kenmore Air SPB. These airports have low passenger levels and correspondingly small terminals. This causes these facilities to be very congested during peak conditions. Among the larger commercial service facilities, Sea-Tac and Tri-Cities had passenger levels that exceeded 60 percent of their terminal capacity in 2005. The FAA recommends that planning for increased capacity be initiated once airports reach the 60 percent capacity utilization threshold.

Exhibit 8-9: Washington Airports with Scheduled Passenger Service, 2005

Airport	RTPO	2005 Enplaned Passengers	2005 Peak Hour Passengers	Terminal Peak Hour Capacity	Capacity Utilization (%)
Seattle-Tacoma International	PSRC	14,245,829	5,500	8,065	68%
Spokane International	Spokane	1,565,529	746	2,205	34%
Tri-Cities	Benton-Franklin	239,320	185	271	68%
Bellingham International /1	Whatcom	103,212	30	149	20%
Yakima Air Terminal	Yakima	57,483	30	176	17%
Boeing Field/King County Int'l	PSRC	46,799	7	160	4%
Pangborn Memorial	North Central	38,434	30	89	34%
Kenmore Air Harbor SPB	PSRC	34,000	8	8	100%
Walla Walla Regional	Benton-Franklin	24,700	30	206	15%
Pullman/Moscow Regional	Palouse	23,059	30	51	59%
William R. Fairchild International	Peninsula	18,932	7	29	24%
Friday Harbor	--	13,017	8	22	36%
Grant County International	Quad-County	12,165	15	132	11%
Kenmore Air Harbor Inc.	PSRC	10,000	8	8	100%
Orcas Island	--	4,490	7	7	100%
Anacortes	Skagit/Island	1,626	9	9	100%

Note: Kenmore Air Harbor is counted as two commercial service facilities according to the proposed State Airport Classifications; commercial scheduled service is offered at two facilities – Lake Union and Lake Washington.

Serving Future Demand

Six airports are expected to exceed their peak hour passenger capacity by 2030

Six Washington airports are expected to exceed 100% of their peak hour passenger capacity by 2030. These airports are the ones that are currently already at or approaching passenger terminal constraints, as described in the section above. The six airports include:

- Anacortes
- Kenmore Air Harbor, Inc.
- Kenmore Air Harbor Seaplane Base
- Orcas Island
- Seattle-Tacoma International
- Tri-Cities

With the exception of Sea-Tac, expected terminal constraints are not significant

Expected terminal capacity shortfalls at these airports, however, range from over 2,000 peak hour passengers at Sea-Tac to a negligible 5 peak hour passengers at Orcas Island and Kenmore Air Harbor, Inc. With the exception of Sea-Tac, terminal capacity constraints at Washington airports are not significant. It is assumed that passengers at the other airports can be accommodated at their existing airport terminals with no or minimal expansion.

The projected passenger terminal expansion requirements for constrained airports are presented in Exhibit 8-10 below.

Exhibit 8-10: Peak Hour Enplaned Passenger Forecasts v. Terminal Capacity

Airport	2005 Terminal Peak Hr Capacity	2005		2030		
		Peak Hour Passengers	Capacity Utilization (%)	Peak Hour Passengers	Capacity Utilization (%)	Additional Terminal Area Required (sq. ft.)
Anacortes	9	9	100%	32	350%	4,025
Bellingham International[1]	149	30	20%	73	49%	
Boeing Field/King County Int'l	160	7	4%	11	7%	
Friday Harbor	22	8	37%	19	86%	
Grant County International	132	15	11%	22	17%	
Orcas Island	7	7	100%	11	153%	700
Kenmore Air Harbor, Inc.	8	8	100%	13	161%	875
Kenmore Air Harbor SPB	8	8	100%	13	161%	875
Pangborn Memorial	89	30	34%	72	81%	--
Pullman/Moscow Regional	51	30	59%	49	96%	--
Seattle-Tacoma International	8,065	5,500	68%	10,274	127%	386,575
Spokane International	2,205	746	34%	1,637	74%	--
Tri-Cities	271	185	68%	313	115%	7,350
Walla Walla Regional	206	30	15%	59	29%	--
William R. Fairchild Int'l	29	7	24%	10	34%	--
Yakima Air Terminal	176	30	17%	56	32%	--

/1 As of 2006, Bellingham has increased its large jet service (130-150 seat MD83/87s) operations which have resulted in a much higher utilization of the airport terminal at peak hour – approximately 80 percent capacity. Ongoing passenger carrier activity and studies at Bellingham suggest that BLI needs further review and analysis vis a vis long-term forecasts and capacity calculations.

Four additional airports will exceed 60% of peak hour passenger capacity by 2030

In addition to the airports expected to exceed 100% of their peak hour passenger capacity by 2030, four additional airports are forecast to exceed the 60 percent activity threshold at which planning for future facility expansion should begin. The airports exceeding the 60 percent planning threshold by or before 2030 include:

- Friday Harbor
- Pangborn Memorial
- Pullman/Moscow Regional
- Spokane International

Bellingham may also exceed its terminal capacity in the near future due to recent service increases

Bellingham International may also approach its terminal capacity in the near future due to airline service increases that have occurred since 2005. The LATS capacity analysis does not identify Bellingham as reaching terminal capacity, because the LATS forecast base year of 2005 preceded Bellingham's rapid passenger growth in 2006 and 2007. Recent studies done by the Port of Bellingham to address this issue, however, have revealed that the airport may need passenger terminal expansion by 2009.

Aircraft Storage Capacity

Why is it Important?

Aircraft storage capacity allows GA based aircraft to be stored in a location that is both safe and convenient when they are not in use

Aircraft storage capacity at airports allows for general aviation (GA) aircraft to be stored in a location that is both safe and convenient when they are not in use. These GA aircraft based in the state are used for a wide variety of purposes including corporate travel, emergency medical transportation, firefighting capabilities, and search and rescue support. Without adequate aircraft storage at Washington airports, aircraft operators may have difficulty serving particular communities and will not be able operate in an efficient manner within the state system.

There are generally two types of storage available at airports: tiedowns and hangars. The decision to utilize either a hangar location or tiedown location is often due to personal preference. Hangar facilities provide an added level of security and protection from the weather versus the use of a tiedown position. Larger hangar facilities are often used by corporate aviation to provide a location where they will base their aircraft, conduct business, co-locate additional company services, and provide the regularly scheduled maintenance for their aircraft.

There is also a need for transient storage positions to accommodate visiting aircraft.

In addition to providing locations for based aircraft at Washington State airports, there is a substantial need for transient storage positions to accommodate visiting aircraft at these same airports. When aircraft move from one airport to another in the course of completing business in the various communities, maintaining a location where they are able to park for several hours or multiple days is essential for support to aviation users. This is an additional consideration for future airport development.

Serving Current Demand

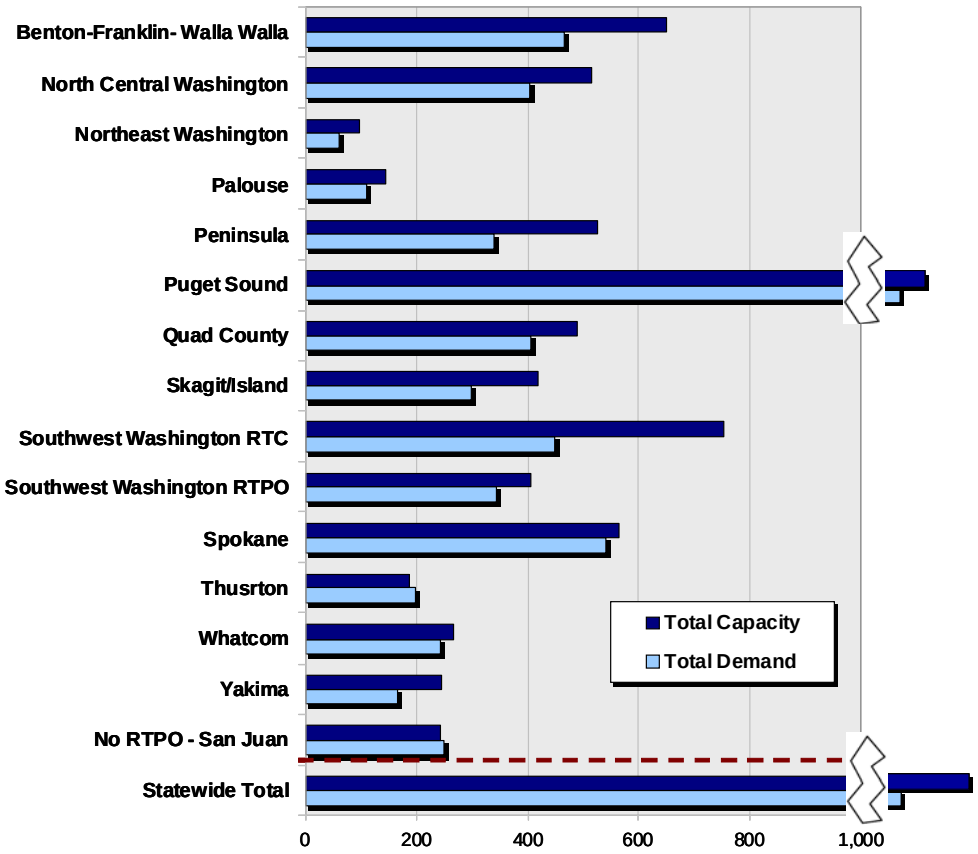
The existing aircraft storage capacity is comprised of both hangar buildings and aircraft tiedown positions at the public use airports across the state. As of 2005, aircraft storage capacity in Washington State totaled 9,772 positions, of which 4,503 were aircraft tiedown positions and 5,314 were hangar units.

In 2005, the airport system as a whole had reached 83 percent of its existing aircraft storage capacity.

In 2005, the state airport system as a whole had reached 83 percent of its existing aircraft storage capacity. Aircraft storage demand in Thurston Regional Planning Council and in the San Juan Islands had exceeded 100 percent of aircraft storage capacity. Aircraft storage demand in Spokane and Whatcom was also approaching capacity. Airports in the Puget Sound Regional Council—accounting for close to half of the available aircraft storage positions in the state—were at 84 percent utilization on average.

The current aircraft storage demand and capacity in Washington State by RTPO is presented in Exhibit 8-11 below.

Exhibit 8-11: 2005 Washington State Aircraft Storage Demand versus Capacity by RTPO



2005 Demand	Total Capacity	Util. (%)
467	652	72%
403	515	78%
61	96	64%
111	144	77%
339	527	64%
3,691	4,373	84%
406	489	83%
299	418	72%
448	752	60%
344	405	85%
541	566	96%
198	186	106%
244	266	92%
166	245	68%
251	243	103%
7,969	**9,552**	**83%**

Hangar facilities are fully utilized at most airports in the state, with pent up demand for additional hangar buildings

The actual demand for hangar facilities is far greater than demand for aircraft tiedown positions. Pilots and aircraft owners in Washington generally prefer secure, weather-proof storage facilities (i.e. hangar units). Hangar facilities are fully utilized at most of the airports across the state and there is still pent up demand for additional hangar buildings. Many Washington airports, especially in the Puget Sound Region, are experiencing a large number of requests to have land leased from the airport to build hangar facilities. As of 2006, airport managers reported a total of 686 people on hangar waiting lists at airports across the state. Another factor contributing to hangar facility demand is the current designation of approximately 29 percent of the available 4,503 aircraft tiedowns in Washington State for transient aircraft usage.

Serving Future Demand

As a whole, the Washington State airport system is expected to have adequate long-term aircraft storage capacity. Aircraft parking and storage is generally constructed "on demand"—that is, tiedown positions and aircraft hangars are typically only constructed as the demand occurs. Assuming the conversion of undeveloped airport land to aircraft basing facilities at airports across the state, the state system as a whole is expected to be only 36 percent utilized in terms of aircraft storage facilities by 2030.

Aircraft storage constraints are expected at several individual airports in Washington

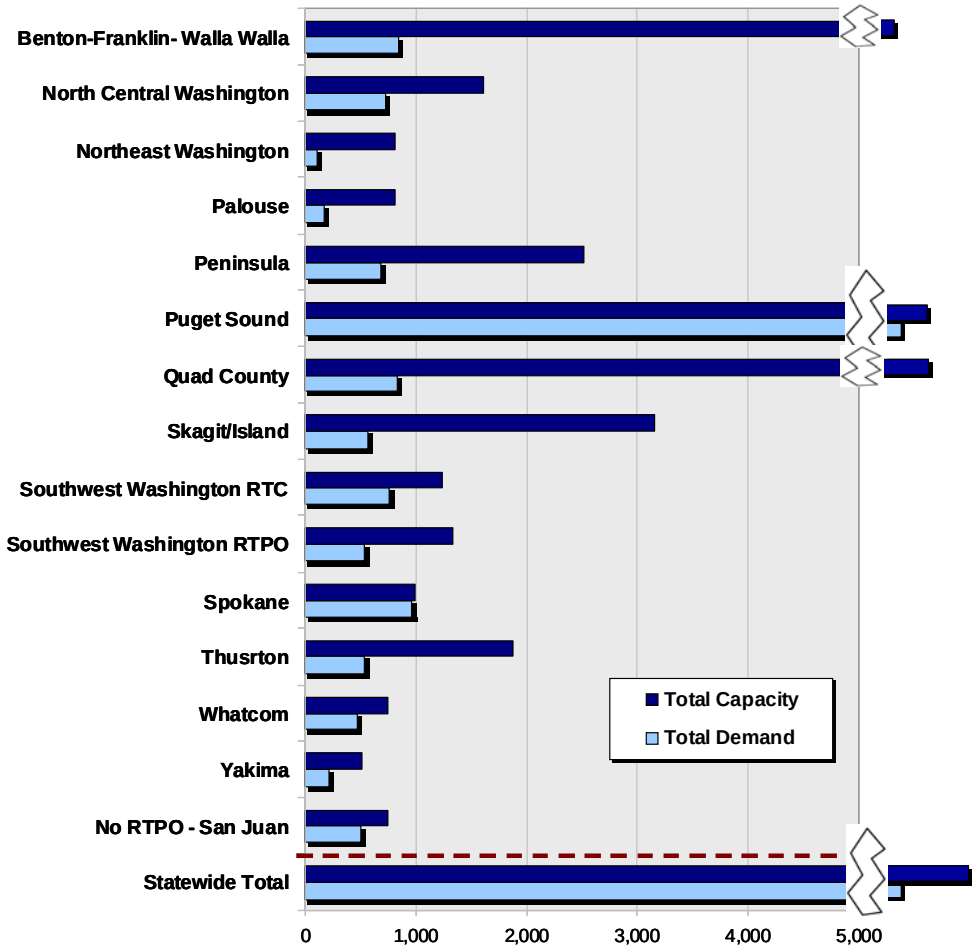
While the overall system is projected to have adequate long-term aircraft storage capacity, aircraft storage constraints are expected at several individual airports in Washington. Approximately one-quarter (36 of 139) of Washington State airports are expected to have capacity shortfalls by 2030. Expected shortfalls range from a substantial 950 based aircraft storage positions at Boeing Field down to a negligible 1 to 2 positions at a number of other airports.

On the following pages, the airports with expected aircraft storage shortfalls are listed in Exhibit 8-12 and Exhibit 8-13 presents the projected aircraft storage demand, total available capacity and percentage utilization by RTPO for 2030.

Exhibit 8-12: Statewide Aircraft Storage Capacity Shortfalls, in number of storage positions

Airport	RTPO	Total 2030 Demand	Aircraft Storage Capacity			Expected 2030 Shortfall
			2005 Capacity	Est. Future Additional Capacity	Total 2030 Capacity	
Boeing Field/King County Int'l	Puget	1,410	479	-15	464	-946
Sanderson Field	Peninsula	219	21	0	21	-198
Felts Field	Spokane	565	310	84	394	-171
Kenmore Air Harbor, Inc.	Puget	138	0	0	0	-138
Crest Airpark	Puget	451	325	0	325	-126
Pearson Field	SW WA RTC	281	154	26	180	-101
Orcas Island	--	200	101	0	101	-99
Colville Municipal	NE WA	111	20	0	20	-91
Western Airpark	Thurston	79	0	0	0	-79
Chelan Municipal	North Central	115	51	0	51	-64
Goheen Field	SW WA RTC	141	87	0	87	-54
Cashmere Dryden	North Central	88	43	0	43	-45
Renton Municipal	Puget	436	290	107	397	-39
Goldendale Municipal	SW WA RTC	51	16	0	16	-35
Lynden Municipal	Whatcom	49	15	0	15	-34
Whidbey Airpark	Skagit/Island	33	0	0	0	-33
Firstair Field	Puget	105	87	0	87	-18
Forks Municipal	Peninsula	30	17	0	17	-13
Port of Whitman	Palouse	105	11	83	94	-11
Sea-Tac International	Puget	15	4	0	4	-11
Davenport Municipal	Quad-County	31	21	0	21	-10
Vashon Municipal	Puget	60	50	0	50	-10
Wilbur Municipal	Quad-County	23	20	-7	13	-10
Sequim Valley	Peninsula	41	35	0	35	-6
Tonasket Municipal	North Central	18	12	0	12	-6
Blaine Municipal	Whatcom	49	35	9	44	-5
Sky Harbor	Puget	5	0	0	0	-5
Willapa Harbor	SW WA RTPO	5	0	0	0	-5
Packwood	SW WA RTPO	6	2	0	2	-4
Swanson Field	Puget	25	21	0	21	-4
Woodland State	SW WA RTPO	23	20	0	20	-3
Lost River Airport	North Central	3	1	0	1	-2
Sunnyside Municipal	Yakima	16	14	0	14	-2
Cross Winds	Spokane	3	2	0	2	-1
Methow Valley	North Central	20	19	0	19	-1
Seattle Seaplanes SPB	Puget	4	3	0	3	-1

Exhibit 8-13: 2030 Washington State Aircraft Storage Demand versus Capacity by RTPO



2030 Demand	Total Capacity	Util. (%)
840	7,008	12%
726	1,604	45%
117	804	15%
168	805	21%
683	2,519	27%
6,798	8,550	80%
826	8,723	9%
561	3,153	18%
765	1,240	62%
539	1,337	40%
961	985	98%
534	1,880	28%
473	753	63%
217	520	42%
503	752	67%
14,711	**40,633**	**36%**

Spokane and the Puget Sound Region are among the RTPO's expected to have the greatest aircraft storage utilization

There are no RTPO's where the forecast aircraft storage demand is expected to exceed the projected capacity by the year 2030. However, the Spokane Regional Transportation Council is projected to be 98 percent utilized and the Puget Sound Regional Council is projected to be 80 percent utilized by 2030. Airports in Southwest Washington Regional Transportation Council, Whatcom Council of Governments, and the San Juan County Islands are also expected to see high levels of aircraft storage demand relative to available capacity.

Ten of the fifteen RTPO's in Washington State are projected to be less than 50 percent utilized in terms of aircraft storage by 2030. RTPO's projected to have the largest amount of available aircraft storage capacity relative to the forecast demand include Benton-Franklin-Walla Walla RTPO, Northeast Washington RTPO, Quad County RTPO, and Skagit/Island.

Air Cargo Capacity

Why is It Important?

Air cargo capacity was measured by the number of enplaned tons of air freight and air mail that can be processed through airport facilities in a year. Though air cargo is a more expensive mode of transport than trucking, rail, or ocean shipment, it supports time-definite needs in manufacturing, document exchange, and finished goods delivery. Air cargo operations support local businesses and directly drive employment for the air carrier at the local airports as well as in courier and trucking organizations.

When air cargo activity becomes constrained, operating costs increase and cargo processing may need to move off-site or to nearby airports

When air cargo activity at airport becomes constrained, several things may happen including:

- Operating efficiency may decrease while operating costs increase.
- Air cargo processing may move off-airport if off-site alternatives are available.
- Cargo may be diverted to alternate modes of transport such as belly-cargo in passenger aircraft or surface transport if available and feasible.
- Cargo may be diverted to alternate nearby airports if available.
- The net result of constrained air cargo operations can be both increased cost of shipping and reduced air cargo service to the communities served.

Serving Current Demand

Air cargo activity is highly concentrated, with over 98 percent of statewide cargo tonnage processed through Sea-Tac, Boeing Field and Spokane

Air cargo activity is highly concentrated in Washington State. While 15 Washington airports reported at least some level of air cargo activity in 2005, over 98 percent of statewide cargo tonnage was processed through three facilities: Seattle-Tacoma International, Boeing Field/King County International and Spokane International. Exhibit 8-14 on the following page presents the air cargo demand at Washington airports in 2005.

Exhibit 8-14: Air Cargo Tonnage at Top 10 Washington Airports, 2005

Rank	Airport		Tons	Percent of Total
1	SEA	Sea-Tac International	373,233	62.06%
2	BFI	Boeing Field/King County	124,620	20.72%
3	GEG	Spokane International	93,424	15.53%
4	PSC	Tri-Cities	3,377	0.56%
5	YKM	Yakima Air Terminal	2,268	0.38%
6	BLI	Bellingham International	1,215	0.20%
7	EAT	Pangborn Memorial	654	0.11%
8	MWH	Grant County International	530	0.09%
9	CLM	Wm. R. Fairchild International	519	0.09%
10	BVS	Skagit Regional	384	0.06%
	All Others		1,211	0.20%
	Total		**601,435**	**100.0%**

Air cargo capacity at airports is difficult to measure due to the contribution of off-airport cargo processing facilities and the direct transfer of cargo from aircraft to local delivery vehicle at small airports

Air cargo capacity is difficult to quantify in many cases due to the way cargo operators can work around cargo facility limitations at airports. Off-airport cargo processing activities currently make significant contributions to air cargo capacity at certain airports such as Boeing Field and Spokane. While standard capacity calculations based on airport cargo building size would suggest that these airports are operating at many times their capacity, the airports do not have major constraints and are operating efficiently in reality.

Air cargo capacity is also difficult to measure at smaller airports where on-airport cargo buildings are typically not utilized at all. At small airports that predominantly handle feeder operations, cargo is generally transferred directly from the aircraft to the local delivery vehicle with no sorting or local "processing" taking place.

The general findings and conclusions regarding air cargo capacity at Washington airports are summarized below.

No significant air cargo constraints currently exist and air cargo companies typically build facilities when they are needed

- No significant air cargo constraints currently exist.
- Air cargo companies build facilities when they are needed.
- Facility expansion occurs as demand grows.
- Excess capacity seldom exists.
- Availability of aircraft parking apron is often the key determinant of an airport's ability to serve air cargo.

Serving Future Demand

Air cargo activity will continue to be concentrated at Sea-Tac, Boeing Field and Spokane in the future

Seattle-Tacoma International, Boeing Field/King County International and Spokane International will continue to handle the bulk of statewide air cargo activity through 2030. Airport-specific findings for these three airports are summarized below.

- Sea-Tac will continue to be the top air cargo airport in Washington State and will likely continue to handle most of the state's international cargo activity. Further expansion of cargo processing facilities at the airport is planned. Cargo aircraft parking and airfield operations constraints, however, will likely be limiting factors to future growth.

Constraints in cargo aircraft parking and airfield operations may limit air cargo growth at airports; however, off-airport facilities may provide a way around

- Boeing Field will continue to handle a large number of air cargo operations, but cargo will generally be processed at off-airport locations. The key factor determining the future growth of air cargo activity at the airport will be the availability of land for aircraft parking apron expansion.
- Spokane is expected to see a steady increase in air cargo demand and will become an even more important air cargo airport for Washington in the future.
- A study of air cargo in the Puget Sound Region was completed by the Puget Sound Regional Council in 2006. The PSRC study addresses air cargo activity within the region and at Sea-Tac and Boeing Field airports specifically and provides a comprehensive strategy for dealing with future air cargo needs in the Puget Sound region.
- In general, the availability of off-airport cargo processing facilities will be an important determinant of the need for expansion or construction of on-airport facilities.

No evidence of air cargo processing constraints at other airports

The analysis found no evidence of constraints to air cargo activity at other Washington system airports. Findings for other small air cargo airports are presented below.

- Pasco, Yakima, Bellingham, Wenatchee, Moses Lake, Port Angeles and Skagit will continue to have small cargo feeder operations. The airports are expected to continue to feed into operations at Sea-Tac, Boeing Field and/or Spokane.
- Cargo handling procedures vary from airport to airport—most are ramp processed directly onto distribution vehicles.
- On-site capacity is not an issue.

Airspace Analysis

An airspace analysis was conducted in LATS in close coordination with the FAA. The analysis addressed airspace associated with Washington's public use airports in order to determine areas where interactions or overlaps in airspace occur. Key findings from the analysis are provided below.

- No significant airspace overlaps occur outside of the three special emphasis regions Puget Sound, Spokane, and Southwest Washington.
- The majority of airspace overlaps in Washington State occur within the Puget Sound special emphasis region, where population and aviation activity are highly concentrated.

The biggest airspace overlap in terms of potential operational conflict occurs between Sea-Tac and Boeing Field

- The most significant airspace overlap in terms of potential operational conflict occurs between Seattle-Tacoma International and Boeing Field/King County International. As such, the proximity of the two airports implies that flight path coordination between the two airports is required.
- Airspace within Washington State is also subject to overlap from airports outside of the state. More specifically, airports in Southwest Washington are affected by Portland International Airport.
- Further study of airspace capacity and available technologies is needed to address future demand anticipated for the Central Puget Sound area. Such a study would fall under the purview of the FAA.