

Chapter 3

FORECASTS OF AVIATION DEMAND & ACTIVITY

This section provides an update of aviation activity forecasts for B19 through the year 2022. The aviation activity forecasts provide input for the assessment of airport facility requirements, evaluation of airport development alternatives, and the formulation of information needed to assess the type and timing of new airport facilities. Utilizing short-(0-5 years), intermediate- (6-10 years), and long-range (11-20 years) planning periods, these projections also aid in the evaluation of potential environmental impacts to the environs on and surrounding the airport resulting from proposed airport improvements.

INTRODUCTION TO FORECASTING

Forecasting is a preliminary step in the planning process. All airport decisions require forecasting to some degree. The attempt in forecasting, like other rational economic actions, is to reduce uncertainty about the future. Forecasts can be used as indicators of whether or not budgetary plans and financial decisions are consistent with the future and with the goals and objectives of the airport.

Estimates of the timing of certain threshold events are the basis for effective planning and financial decisions. In airport planning, these events correspond to levels of aviation demand, which may exceed existing or planned capacities of the airport. The objective in airport forecasting is to predict when certain levels of demand will occur. However, no matter how complex the forecasting model might be, the results are still little more than calculated guesses tempered by sound planning judgment.

Forecast Elements

The forecasts of aviation demand required to develop an airport master plan for a general aviation airport primarily concerns based aircraft, aircraft operations, and the aircraft mix. To address peak operational or facility based demand, derivative forecasts are also developed. The primary forecast elements for Biddeford include:

- ❖ based aircraft and fleet mix,
- ❖ operations (further analyzed by fleet mix, itinerant, and local),
- ❖ instrument operations, and
- ❖ peak hour operations and passenger movement.

Forecast Scope

Forecasts of applicable elements are presented for the three forecast horizons as required for airport master planning purposes in the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6A, Airport Master Plans.

Base Year

The base year for this study is 2002 with adjustments when possible to present the most current data available.

Factors Affecting Aviation Forecasts

Certain factors were found to be of particular significance and were considered in forecasting aviation demands for the Biddeford master plan. Discussions concerning the following are presented in this section:

- ❖ Impact of September 11
- ❖ Aviation insurance costs
- ❖ Airport service area
- ❖ Maine Aviation Systems Plan Update
- ❖ Biddeford Industrial Park
- ❖ FAA National Plan of Integrated Airport Systems,
- ❖ FAA Terminal Area Forecasts,
- ❖ FAA Aerospace Forecasts,
- ❖ Previously developed forecasts,
- ❖ Historical aviation activity,
- ❖ Tourism, and
- ❖ Those unidentified factors that will impact future development at the airport.

Impact of September 11

September 11, 2001 was expected to have a short-term effect on the U.S. economy and the general aviation industry. In addition, changes in the nation's transportation network because of 9/11 and ongoing security concerns have impacted general aviation. Costs associated with heightened security measures and insurance industry concerns have affected general aviation through higher user fees. The impact on the Aviation Trust Fund and its availability for future AIP improvements is still in doubt.

Aviation Insurance Costs

Another key issue is the aviation insurance market. Premiums have risen significantly during the past several years, forcing many marginal FBOs out of business, or at a minimum, forcing them to eliminate flight training. If this trend continues, flight training as we know it today will cease to exist, with only the larger more affluent schools offering this instruction. The long term effect if the crisis continues will be an overall decline in operations because of its impact on flight schools, particularly the smaller FBOs that will be forced to raise rates and/or drop coverage and aircraft rentals.

Airport Service Area

The airport service or market area is defined as the area where aircraft owners/pilots reside and are willing to travel to Biddeford versus another airport in the region. In the case of a commercial service airport, it's the area where potential passengers would probably reside. Since there is no scheduled service at Biddeford this discussion is limited to the general aviation market area. In addition, itinerant pilots flying into the region can choose between five public use facilities within 25 miles of Biddeford; these include Portland International Jetport, Sanford Regional Airport, Limington-Harmon Airport, Skyhaven, and Littlebrook, with Pease International Tradeport located in Portsmouth, NH, just beyond the 25 mile range. The closest general aviation airport to Portland and coastal communities is Biddeford.

A sample of pilots that currently use Biddeford as their home base was reviewed to determine a realistic service area for the airport. Of the 25 aircraft owners sampled, 95 percent live within 15 miles of the airport. For purposes of this AMPU demographic data provided by the U.S. Census for York County will be used since it closely resembles the size of the airport's service area. This area also correlates closely to the established 30-minute service area established by in the aviation systems plan discussed next.

Maine Aviation Systems Plan

The Maine Department of Transportation completed the Phase I update of the Maine Aviation Systems Plan (MASPU) in 2001, which is a guide to assist the Office of Passenger Transportation (OPT) in allocating airport funds.¹ Of particular interest to this update are the forecast methodologies and anticipated growth rates for Biddeford, projected based aircraft and operations, airport reference code, the airport's functional level, and how the airport fits into the overall state plan.

This AMPU will use the MASPU data as a baseline for the forecasts presented, however, some adjustments will be necessary because the MASPU relies on a top-down approach, analyzing

¹ Prepared by Wilber Smith Associates, Inc., Portland, ME with OEST Associates (2001/2002)

data on a statewide basis. To obtain accurate forecast data for Biddeford, a bottom-up approach must also be used, analyzing data from the local community and service area. Base year data in the MASPU will also be adjusted to reflect the most recent information available.

MASPU Airport Classifications

The MASPU classifies airports into four categories, or function levels, based on several factors, such as accessibility, population, facilities, etc. These function levels identify facilities and services that should ideally be available at airports within those four levels (I, II, III, and IV).

Level I airports accommodate commercial airline service and a full range of general aviation aircraft, while Level IV airports accommodate only single engine general aviation aircraft. Level II and III airports fall in between. Biddeford Municipal Airport is classified as a Level II facility, meaning it should be capable of accommodating all business and personal use single- and twin-engine general aviation aircraft, and some small corporate and business jet aircraft. Schedule commercial airline operations are not typically accommodated at Level II airports. In addition, Level II airports should be capable of supporting:

- ❖ aircraft design group Category B aircraft (an ARC component),
- ❖ runways between 3,500 but less than 5,000 feet in length and 75 feet wide; and
- ❖ airside, landside, and service levels, which will be addressed throughout the remaining sections of this AMPU.

In developing its forecasts, the MASPU identified historic relationships between Maine aviation and U.S. aviation activity, along with actual demand trends experienced at each airport, with the state, region, and at a national level. Demand projections were then developed for both commercial and general aviation.

MASPU Forecasts

To summarize the findings, the systems plan forecasts a 1.1 percent average annual growth rate for based aircraft statewide. In 2001 Biddeford had 41 based aircraft, or 4.5 percent of the state's total. By application of the 1.1 percent growth rate, Biddeford is projected to have 50 aircraft at the end of the 20 year planning cycle (2021). The fleet-mix is forecasted to change in its composition as jet aircraft production is expected to outpace growth in other components of the general aviation industry. The number of single and multiengine aircraft is expected to decrease as a percentage of the whole, while turboprop aircraft increase, as a percentage. The report does not breakout turboprop aircraft in its analysis.

Operations are forecasted to grow at a slightly higher rate of 1.6 percent, on average, during the same 20-year period. The MASPU reports 30,750 operations at Biddeford in 2001, increasing to 37,740 in the year 2021. The report did not differentiate between local and itinerate operations.

The MASPU forecasts for based aircraft, fleet-mix, and operations are shown in Tables 3-1 through 3-3.

Table 3-1
MASPU Based Aircraft Forecasts
Biddeford Municipal Airport

2001	2006	2011	2021
41	46	47	50

Source: MASPU Phase I (Table 4-1)

Table 3-2
MASPU Projections Annual GA Operations
Biddeford Municipal Airport

2001	2006	2011	2021
30,750	34,240	35,370	37,740

Source: MASPU Phase I (Table 4-3)

Table 3-3
MASPU Projections of Based Aircraft Fleet Mix
(Statewide)

Aircraft Category	2001		2006		2011		2021	
	Aircraft	Mix	Aircraft	Mix	Aircraft	Mix	Aircraft	Mix
Single Engine	786	86.6%	844	86.0%	879	85.3%	949	84.1%
Multiengine	82	9.0%	85	8.7%	88	8.5%	94	8.3%
Jet	12	1.3%	19	1.9%	26	2.5%	38	3.4%
Helicopter	11	1.2%	14	1.4%	16	1.6%	21	1.9%
Other	17	1.9%	20	2.0%	22	2.1%	26	2.3%
Total	908	100%	982	100%	1,031	100%	1,128	100%

Source: MASPU Phase I (Table 4-1)

MASPU Assumptions

It is important to note that the MASPU was prepared on a statewide basis and then adjusted to the local level by assuming existing levels of activity (based aircraft, fleet mix, and operations) will remain constant to statewide data. For instance, Biddeford had 4.3 percent of all statewide based aircraft in 2001. The MASPU methodology assumes that this percentage will remain the same, regardless of local changes for the next 20-years. A more localized forecast for smaller, local areas must be undertaken through individual master plans (such as this one).

MASPU Demographic and Economic Indicators

The MASPU does provide valuable data concerning local demographics and economic indicators at each of the state's public-use airports and then compares this data with existing facilities to show whether an airport and its facilities match the economic makeup of the local service area. Benchmarks are used to evaluate the system for its ability to adequately support economic growth and diversification. The benchmarks used include:

- ❖ concentrations of hotels and motels,
- ❖ employment,
- ❖ population growth projections,
- ❖ proximity to four-lane highways,
- ❖ post-secondary college enrollments,
- ❖ proximity to Intermodal rail and port facilities, and
- ❖ proximity to one of Maine's 69 service centers.²

MASPU Airport Rankings

For this performance measure, airports were ranked from 1 to 36, with 1 being the lowest ranking an airport could receive and 36 being the highest ranking. After the airports were ranked for each benchmark, their scores were totaled, and ranked into four groups (similar to the four function level or system ranking). If the airport's system level is comparable to its economic rank, this indicates that airport facilities are reasonably well-matched to the service area's economic characteristics. If the economic rank for the service area is higher than the airport's system level, this could signal the need to consider upgrading the airport and its facilities and service to a higher system level. Moreover, if the airport's system level is higher than the economic rank, it is possible that the airport is playing an important role in meeting the state's transportation needs. Biddeford Municipal Airport had an overall score of 197 (out of a possible

² As established by the Maine Office of Statewide Planning, the state has 69 service centers that equate to the primary and secondary economic nodes of Maine.

288), which correlates to an economic ranking of I. Since its service, or function level is II, upgrades to airport facilities and/or services may be necessary.³

MASPU Relationship to this AMPU

The forecasts prepared in this AMPU will consider the MASPU findings and then adjust them according to demographics (shifts in population, income, etc.) to provide a more exact forecast for the Airport. In addition, the relationship between the airport's economic ranking and current service level will be considered when facility recommendations are made in Section 4 of this AMPU, "Facility Recommendations".

Biddeford Industrial Parks

The city of Biddeford acquired land and constructed three fully-serviced industrial/business parks between 1970 and 1984. They are the Exit 4 Business Park, the Alfred Road Business Park, and the Airport Business Park. By any measure, the parks have been enormously successful in attracting scores of businesses while creating hundreds of jobs and expanding and diversifying the City's tax base.⁴

The Airport Industrial Park abuts the airport off U.S. Route 1 (Elm Street). The area contains approximately 653 acres of land (including the airport). There are 12 manufactures located in the park occupying a total of 218,000 square feet of manufacturing space for an average plan size of a little less than 20,000 square feet. There are a total of 24 vacant parcels of land of one acre or more in the area plus a few very small parcels. Five of the lots have street frontage within the Airport Industrial Park, but they are widely believed to be undevelopable due to severe wetland conditions that would preclude obtaining environmental approvals. There are three parcels on Hill Street that abuts the airport property but are also reported too wet to be developed very intensively.⁵

FAA National Plan of Integrated Airport Systems Summary

The NPIAS summary is a published national plan for the development of public-use airports and is derived from a selective compilation of local, regional, and state planning studies.⁶ The national system is structured to provide communities with access to safe and adequate airports. According to the most recent NPIAS, 98 percent of the nation's population lives within 20 miles of a NPIAS airport. Only those airports included in the NPIAS are eligible for federal funding.

³ The MASPU is in the draft version and the airport's service level is subject to change; however any impact to the outcome of the forecasts and conclusions and recommendations in this report would be minimal, if any.

⁴ <http://www.biddefordmaine.org>

⁵ City of Biddeford Comprehensive Plan, Page 17.

⁶ <http://www2.faa.gov/arp/planning/npias/>

However, an airport's inclusion in the NPIAS does not represent federal approval, nor does it commit the Federal government to participate in the cost of any project.

The FAA classifies airports into categories based on service levels and/or roles. Service levels are based on scheduled passenger enplanements and service roles are based on the type of aircraft an airport can accommodate. The four classifications are primary commercial service, non-primary commercial service, reliever, and general aviation. Biddeford is classified as a general aviation airport (see *National Plan of Integrated Airport Systems*, Page 15).

Funding priorities are issues addressed by NPIAS as well. General aviation airports generally receive a lower priority for AIP funds than airports in the higher tiers, "reliever", and "commercial service" airports.

Of the 35 facilities identified in Maine, \$112,644 was earmarked for development costs between the period 2001 and 2005. Of this, \$1,000,000 or 0.9 percent of the total is allocated for Biddeford. This amount is not static and is not a commitment to future project funding, but rather reflects the correlation of statewide funding for AIP projects.

FAA Terminal Area Forecasts

The Terminal Area Forecast (TAF) System is the official forecast of aviation activity at FAA facilities. This includes FAA-towered airports, federally-contracted towered airports, nonfederal towered airports, and many non-towered airports.⁷ Detailed forecasts are developed for the major users of the National Aviation System:

- ❖ large air carriers
- ❖ air taxi/commuters
- ❖ general aviation
- ❖ military

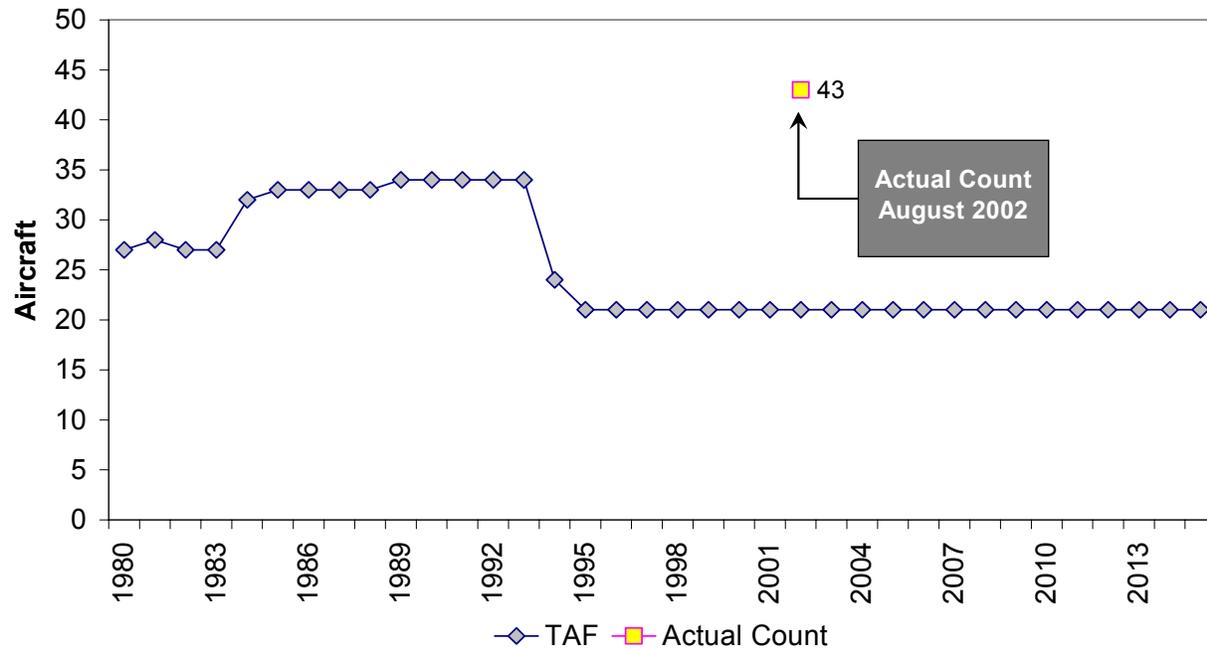
These forecasts are prepared for both operations and based aircraft as offered below.

Based Aircraft

Figure 3-A shows the historic based aircraft 1980 through 1994 and the forecasted trend from 1995 through 2015. No explanation can be found to explain the sudden drop in aircraft between 1994 and 1995. The graph also shows the actual count obtained in August 2002 as part of this study.

⁷ The aviation forecasts contained in the TAF for Fiscal Years 2001-2015 do not incorporate any impact of the September 11 terrorist attacks. The forecasts do, however, provide government and aviation planners with a valuable benchmark to measure the impact of the September 11 events.

Figure 3-A
TAF Historic and Forecasted Based Aircraft



Operations

The FAA TAF also reports historic and forecasted operations. This was first addressed in Section 2 of this report (see Page 44). However, this data is not considered reliable for the reasons discussed. The TAF shows current operations at 35,200 (25,000 local and 11,200 itinerant). However, because there is no reliable means of counting operations at Biddeford, an estimate must be used in lieu of control tower records, or other systems. In Section 2 of this report (paragraph H.2.d), it was shown that FAA guidelines suggest measuring itinerant operations by the number of based aircraft, which is an easier and more reliable number to assess. The median number of 210 operations per based aircraft was used, resulting in approximately 9,000 itinerant operations. The itinerant/local mix, established at a 30-70 percent mix in Section 2 of this report, will still be used. This translates to 21,000 local operations, for 30,000. Short of any other means of establishing the actual operations at Biddeford, 30,000 operations will be used instead of the TAF count of 35,200. This closely correlates with the MASPU 30,750 (see Table 3-1, Page 61).

FAA Aerospace Forecasts

The FAA's Aviation Policy and Plans Division at Washington, D.C. develops policies, goals and priorities, forecasts future aviation demand, and analyzes economic impacts of all hub airports and selected reliever/general aviation airports around the country. Normally a detailed review of this document is presented in the AMPU because it offers a reliable and current analysis of aviation. However, because the MASPU relied on these forecasts when preparing statewide projections for aviation growth in Maine, no further discussion is necessary.

Summary of Previous Master Plan Forecasts

Table 3-4 presents data from the last two master plan updates in 1975 and 1985. As shown, the combined growth from the mid 1970s through 2003 exceeds existing conditions considerably. One reason for this overly optimistic growth rate was an assumption that critical issues would be corrected, such as aircraft parking restrictions and the addition of a second runway (crosswind to Runway 6-24). The second is because of unforecasted higher fuel and insurance costs.

Table 3-4
1975 and 1985 Master Plan Forecasts

Segment	1974	1980	1983	1988	1993	2003	Forecasted Growth
Based Aircraft	29	30	33	50	64	96	8.3%
Total Operations	N/A	N/A	40,490	50,500	64,000	97,500	7.4%

Source: 1985 Master Plan

Tourism

Maine, particularly coastal Maine is, and will continue to be a popular location for tourist, from in-state, out-of-state, and foreign locations. Biddeford Municipal Airport is ideally located just a few miles from some of the most popular stretches of beach and high tourist locations in the state (Old Orchard Beach, Kennebunk, York, etc.). If the airport is developed to permit a high influx of visiting pilots, and their tourist dollars, demand for the airport will inevitably grow, provided there is space for visiting aircraft to park and adequate services and facilities. At the very least the airport can expect to see a shift in the percentage of itinerant aircraft in the planning years.

A related issue and an on-going debate in both the Biddeford area and statewide, is the movement toward development of a casino in the state. Proponents are pushing for a change in state law, which if passed, would open up the opportunity for this type of enterprise, whether in Southern Maine, or elsewhere in the state. This type of business may influence aviation operations at local airports, potentially creating increased demand for itinerant aircraft services and facilities.

Assumptions

Like all forecasts, certain assumptions must be made. For the predictions that follow, certain developments must happen; otherwise the calculations in this study are invalid, much like those in the 1975 and 1985 updates.

The city of Biddeford is in excellent position to compete for a small share of the general aviation market with both Portland International Jetport and Sanford Regional Airport. Portland is a growing commercial airport with no general aviation hangars, and only a few commercial hangars with high rental costs. Changes in security measures at the Jetport create access problems to the apron area not found at small airfields, which tend to discourage general aviation pilots from using the facility. Additionally, the size of the airport and its control tower add taxi and wait time to each flight that equates to costs not incurred at Biddeford.

Sanford Regional Airport is a growing general aviation facility that currently maximizes its available ramp and hangar space, and is looking for room to expand. Sanford is also located inland from the busy coastline of Maine and not as easily accessed as Biddeford is because of the local highway network. The MASPU scored Sanford as “Medium” in its accessibility ranking, compared to a “High” ranking for Biddeford. The time-distance relationship between Biddeford and Sanford will govern the increase in activity at both airports. Pilots who live along the coast, particularly those who live closer to Biddeford will opt for the shorter drive, provided facilities are improved. Driving time from Interstate 95 (Maine Turnpike Exit 4) is approximately 5 minutes to the Biddeford Airport as compared to 20 minutes to Sanford Regional Airport (also from Exit 4).

Biddeford must provide the facilities needed to accommodate the anticipated growth. This means if the forecasts that follow are to hold true, apron and hangar space must be made available, as well as other recommended improvements. Short of this, growth at Biddeford Municipal Airport may be limited.

DEMOGRAPHICS

Population

The size and composition of the service area's population - and its potential for growth - are basic ingredients in creating demand for air transportation services. In addition, the geographic distribution and distances between populations and centers of commerce within the area served by the airport may have a direct bearing on the type and level of transportation services that will be required.

Historically, the population in the service area (York County) grew at an average annual rate of 1.4 percent (13.5 percent overall) during the period 1990 to 2000, from approximately 165,000 to 187,000.⁸ During the same period the state population increased at the rate of 0.4 percent annually (4 percent overall). More specifically, the population in the city of Biddeford grew by only 1.1 percent during the same period.⁹ However, neighboring towns and cities, which are in close proximity to the airport, for the most part grew at rates well above York County and the state during the same period (1990-2000).

❖ Saco.....	10.8 percent
❖ Old Orchard Beach	13.7 percent
❖ Wells	20.9 percent
❖ Ogunquit	25.9 percent
❖ Kennebunk	30.9 percent
❖ Arundel	33.8 percent

For the most part, the county population grew at a higher rate to the south of Biddeford, particularly along the coast. Towns and cities inland and north of the city grew at a much slower pace. This is consistent with the rest of the state. Since the 1930's, the coastal counties, with the exception of Washington (the most northern and eastern county), have generally experienced faster population and economic growth in the state. The Maine State Planning Office (MSPO) expects this trend to continue over the forecast horizon, with an average annual population change of 1.0 percent in York County and 0.5 percent in the state. In addition, the cities listed above are all on the east side of the Maine Turnpike (Interstate 95) and within easy driving distance to Biddeford. This relates back to the time-distance relationship discussed earlier.

Income

Income determines the ability of people to use the transportation network. In the case of general aviation, disposable income is the driving economic incentive that can be used to buy or rent aircraft and to pay for flight training, maintenance, insurance, and other related expenses.

⁸ Maine State Planning Office (December 2001), Forecast of Maine State/County/City/Town Populations

⁹ www.state.me.us/spo/census.frequent.htm

Per capita income in the service area was reviewed and compared with state and U.S. levels to determine the relationship. Our analysis shows that during the period 1990 to 2000, per capita income in York County was comparable with U.S levels, and exceeded state levels by about 8 percent, and is forecast to remain well above state levels and in-line with the U.S.¹⁰

Demographic Summary

The population in York County is estimated to grow over the next 10-20 years by the rate of 1.0 percent. Similarly, income will continue to keep pace with that of the U.S., and ahead of the statewide average. Both trends indicate continued potential growth at the airport.

SUMMARY OF FORECASTS

The preceding addressed forecasts at the national, state, and county, or service area levels. In addition, trends at the local airport level were examined. The 1985 master plan was overly optimistic in its predictions, in part because of planned changes at the airport that did not materialize, and because of unforecasted increases in both fuel and insurance premiums, both of which resulted in a dramatic decline in flying in the early part of the last decade. While fuel costs have stabilized, insurance remains a large question mark. Overall it would appear that demographics will have a positive affect on growth at Biddeford Municipal Airport because they represent a higher than average growth rates then the state as a whole, which was used in the preparation of the MASPU addressed earlier.

The MASPU predicts a 1.1 percent annual growth rate in based aircraft during the next 20 years, statewide, and a 1.6 percent annual increase in operations during the same period. The entire industry will see a shift away from single and multiengine (reciprocating) aircraft, and an increase use of turbofan (jet) aircraft. However, the MASPU prepared its forecasts at the statewide level.

What the state systems plan does show are strong benchmarks in terms of economic indicators in the Biddeford area. The economic benchmarks in the number of hotel/motels, population growth, employment growth, and other indicators in the Biddeford service area are all strong, averaging well above most other regions in the state. This indicates that the Biddeford area will see a higher growth rate than most other areas.

Based on the information reported, it is anticipated that Biddeford Municipal could see a growth in general aviation in the range of 1.5 to 2.5 percent per year. The low end growth (1.5 percent) is predicated on, at minimum, that the apron deficiencies and obstruction problems discussed in Section 2 of this report are corrected. This would provide a safer environment and provide

¹⁰ www.census.gov

ample room for aircraft parking. In addition, hangar development must continue, providing affordable space for the average aircraft owner and the FBO continues to offer affordable services and other airport maintenance and services are maintained or improved. High end growth would be predicated on airport expansion (longer runway, better instrument approaches, parallel taxiway, etc.). Some airports in the region have seen unprecedented growth, such as Wiscasset where based aircraft have doubled in less than three years because of a highly proactive FBO. Other airports have seen a decline, or at very best, stagnated growth because facilities have not kept pace with demand and repairs are slow to materialize.

At the national level, FAA Aerospace forecasts indicate that the recreational side of general aviation will decline slightly, and then grow at a very slow pace during the next several years, followed by an increase in the intermediate term, but at a rather slow growth rate. Every sector involving recreational flying (piston aircraft deliveries, hours flown, new student pilots and private pilots) all reflect a negative or at best, a very slow growth rate. On the other hand, the sectors that relate to business flying (turbine and turbojet fleet growth and hours flown, new commercial pilots, and most notably, utilization of fractional aircraft) show a modest growth rate. However, this will have a minimal impact on Biddeford because the airport is not currently a large draw for this type of activity because of the short narrow runway and other issues addressed earlier.

Demographics will play a significant role in growth at Biddeford. As the population in the service area continues to grow, demand for transportation services will increase, keeping pace with national trends.

The wildcard is tourism and the ability of the community to meet the demand that general aviation will create at the airport. If visiting pilots can easily park, find ground transportation in the form of rental cars, taxis, bus service, etc., they will likely use Biddeford in an increasing rate. For those who can afford alternative fast transportation, the type that general aviation provides, airports centrally located in high tourist regions will benefit the most.

Aviation Forecasts for Biddeford

The forecast process attempts to identify probable assumptions and then extend those assumptions, mathematically, into the future. By themselves, the forecasts that follow serve as a general guide to likely future trends. This process is not exact science and only represents the consultant's best opinion of likely growth. This is based on incorporation of all factors discussed above.

Growth at the Airport will reflect the national trend for the recreational part of general aviation; slow for the next year or two, but picking up momentum as the U.S. economy improves. On average the airport can expect to see growth in the range of 1.5 percent to 2.5 percent per year, non-compounded. For the purposes of this study, the median (2 percent) will be used. This rate will apply across the board to both based aircraft as well as the various components of aircraft

operations (local, itinerant, business class, fuel sales, etc.). The only exception will be the number of instrument approaches conducted at the airport, which will increase at a higher rate for reasons that will be addressed later in this report.

General Aviation Based Aircraft

Based aircraft will likely grow at the rate of 2 percent per year, increasing from the current 43 to approximately 60 in 20 years. The MASPU forecasts 50 aircraft by the end of the planning period, but this is based on a 1.1 percent growth rate statewide. Table 3-5 shows the projected numbers for the next 5, 10, and 20 year periods.

Table 3-5
Based Aircraft Forecasts

2002	2007	2012	2022
43	47	52	60

Source: Dufresne-Henry, Inc., analysis

Fleet Mix Based Aircraft

The fleet mix will change over the course of the planning period, with single-engine piston aircraft declining as a percentage of the total, and turboprop aircraft increasing very slightly. This adjustment is the result of FAA Aerospace forecasts that indicate a slow growth market for recreational piston aircraft in terms of production and use, but an increased production of low-cost turboprop and turboprop aircraft, such as the Pilatus and the Eclipse 500, a relatively low cost 6-seat turboprop aircraft.¹¹ Table 3-6 shows the changes forecasted throughout the planning period, which are fairly close to the MASPU statewide data presented earlier in Table 3-2 on Page 61.

Operations

Operations were established at 30,000 in the base year 2002, slightly lower than the MASPU 30,750. It is anticipated that operations will grow at the same rate as based aircraft, 2 percent per year.

As reported in Section 2 of this report, the local versus itinerant operations mix was a 70 to 30 percent split, respectively in 2002. However, increased tourism in the region will result in a higher number of itinerant aircraft, accounting for 40 percent of total operations at the end of the planning period. The forecasted operations and local versus itinerant mix is shown in Table 3-7.

¹¹ <http://www.eclipse.com>

**Table 3-6
General Aviation Based Aircraft - Fleet Mix**

Aircraft Category	2002		2007		2012		2022	
	Count	Mix	Count	Mix	Count	Mix	Count	Mix
Single-Engine Reciprocating	40	93%	44	92%	46	90%	53	88%
Multiengine Reciprocating	3	7%	3	6%	2	4%	2	4%
Turboprop	0	0%	1	2%	3	5%	4	6%
Turbofan	0	0%	0	0%	1	1%	1	2%
Helicopter	0	0%	0	0%	0	0%	0	0%
Totals	43	100%	47	100%	52	100%	60	100%

Source: Dufresne-Henry, Inc., analysis

**Table 3-7
Operations Forecast**

Type Operations	2002		2007		2012		2022	
	Count	Mix	Count	Mix	Count	Mix	Count	Mix
Local	21,000	70%	22,440	68%	23,400	65%	25,200	60%
Itinerant	9,000	30%	10,560	32%	12,600	35%	16,800	40%
Total	30,000	100%	33,000	100%	36,000	100%	42,000	100%

Source: Dufresne-Henry, Inc., analysis

Local Operations Fleet Mix - Local operations are forecasted at the fleet mix level of detail for infrastructure planning. These elements are necessary for planning of apron and hangar space as well as an analysis of the airside infrastructure. It is anticipated that the mix will migrate away from single- and multiengine reciprocating aircraft toward turboprop in the later planning years. Local turbofan operations will increase very slightly in the intermediate and long-terms as prototype aircraft, such as the Eclipse 500 and Diamond D aircraft come into production. The forecasted mix for local operations is shown in Table 3-8.

**Table 3-8
Local Operations - Fleet Mix**

Aircraft Category	2002		2007		2012		2022	
	Count	Mix	Count	Mix	Count	Mix	Count	Mix
Single-Engine Reciprocating	19,530	93%	20,645	92%	21,060	90%	22,176	88%
Multiengine Reciprocating	1,470	7%	1,346	6%	936	4%	1,008	4%
Turboprop	0	0%	449	2%	1,170	5%	1,512	6%
Turbofan	0	0%	0	0%	234	1%	504	2%
Helicopter	0	0%	0	0%	0	0%	0	0%
Totals	21,000	100%	22,440	100%	23,400	100%	25,200	100%

Source: Dufresne-Henry, Inc., analysis

Itinerant Operations Fleet Mix - For infrastructure planning, itinerant operations are forecasted at the fleet mix level of detail. The tourist industry will continue to grow in the region, changing the overall mix of local versus itinerant operations. As a result, the airport can expect to see a larger portion of visiting aircraft, pilots, and passengers, placing a greater demand on terminal space (in the form of FBO facilities at small general aviation airports) and ground transportation needs. Similar to the based aircraft mix, itinerant operations will see a larger portion of turboprop aircraft over single and multiengine reciprocating aircraft, with a slight increase in the number of turbofan operations as percentage of the whole. Table 3-9 shows the forecasted itinerant operations fleet mix and Table 3-10 totals the combined local and itinerant operations.

Instrument Operations - Instrument operations are forecasted to ensure adequate facilities are available to support demand. Facilities include both airside (ground based electronic equipment and lighting) and landside infrastructure (pilot planning and filing facilities, computer and voice equipment, weather data). Like aircraft operations data, instrument operations records are not maintained. While the FAA provides instrument service to Biddeford, the local approach control facility at Portland International Jetport does not record instrument approach and departure data individually for this airport. Therefore, the only way to accurately assess the number of operations is to estimate the total.

**Table 3-9
Itinerant Operations - Fleet Mix**

Aircraft Category	2002		2007		2012		2022	
	Count	Mix	Count	Mix	Count	Mix	Count	Mix
Single-Engine Reciprocating	6,660	74%	7,814	74%	9,072	72%	11,760	70%
Multiengine Reciprocating	900	10%	950	9%	1,008	8%	840	5%
Turboprop	1,170	13%	1,478	14%	2,016	16%	3,024	18%
Turbofan	90	1%	106	1%	252	2%	840	5%
Helicopter	180	2%	211	2%	252	2%	336	2%
Totals	9,000	100%	10,560	100%	12,600	100%	16,800	100%

Source: Dufresne-Henry, Inc., analysis

**Table 3-10
Total Operations - Fleet Mix**

Aircraft Category	2002		2007		2012		2022	
	Count	Mix	Count	Mix	Count	Mix	Count	Mix
Single-Engine Reciprocating	26,190	87%	28,460	86%	30,132	84%	33,936	81%
Multiengine Reciprocating	2,370	8%	2,296	7%	1,944	5%	1,848	4%
Turboprop	1,170	4%	1,927	6%	3,186	9%	4,536	11%
Turbofan	90	0%	106	0%	486	1%	1,344	3%
Helicopter	180	1%	211	1%	252	1%	336	1%
Totals	30,000	100%	33,000	100%	36,000	100%	42,000	100%

Source: Dufresne-Henry, Inc., analysis

Data from four towered airports in the region¹² was reviewed to determine the based aircraft to instrument operations ratio. All four airports have operating controls towers that record aircraft operations (only one airport has commercial service¹³). The average number of recorded instrument operations to based aircraft was 36. Using this information, a total annual instrument operations count at Biddeford can be estimated. By itself this number is probably on the high side since Biddeford does not have a precision approach (a favorite with pilots practicing instrument operations). Therefore, for planning purposes this number will be reduced by 50 percent, or 750 annual operations in the base year.

Table 3-11
Instrument Operations

2002	2007	2012	2022
750	825	900	1,050

Source: Dufresne-Henry, Inc., analysis

Unlike other forecasts, instrument operations are expected to increase at a higher rate than other areas because more pilots are earning their instrument rating as a percentage of total pilot certificates. FAA forecasts indicated that instrument operations will increase in the New England Region by 3 percent per year between 2002 and 2013.¹⁴ This rate will be used to forecast instrument operations at Biddeford throughout the planning period. Table 3-11 contains the forecasted instrument operations.

Peak Hour

PH operations and passengers are forecasted to assist in the development of the landside infrastructure, in particular itinerant apron areas, terminal building space, and auto parking areas. PH was addressed in Chapter 2 (Page 46) where it was shown that the current peak hour occurs in July and results in 30 operations and 17 passengers per hour. The assumption is that July will remain the PM because of the higher than usual tourist visits to the state during the summer months, coupled with winter weather conditions that restrict flying.

Passenger movement, which includes the pilot and passengers, requires further assumptions because the number of passengers per aircraft must be forecasted. Approximately 91 percent of the total operations in the base year were from single engine reciprocating aircraft, with a typical maximum passenger loading of four (pilot and three passenger seats), and an average occupancy of 1.5 people (including the pilot). This resulted in a PH passenger impact of 41 (see Pages 46 and 47).

¹² Beverly Municipal (Beverly, MA); Boire Field (Nashua, NH); Lawrence Municipal (Lawrence, MA); and Lebanon Municipal (Lebanon, NH).

¹³ Lebanon (LEB) has very limited commercial service, with 3 flights per day (6 operations).

¹⁴ *Forecasts of IFR Aircraft Handled by FAA Air Route Traffic Control Centers FY2002-2013*, Statistics and Forecasts Branch, Office of Aviation Policy and Plans, Federal Aviation Administration (May 2002).

The 1.5 passenger per aircraft seating configuration will change, however slightly, during the planning period as slightly larger aircraft, with a capacity of 6 to 8 people, frequent the airport more often. It is anticipated that the average aircraft load will increase to 2 passengers per aircraft during the intermediate time-frame, and as high as 2.5 toward the end of the 20 year planning period. Application of the overall growth rate of 2 percent results in the peak operations and passenger numbers shown in Table 3-12.

Table 3-12
Forecasted Peak Passengers

Period	Annual Operations	PM Operations	PMAD Operations	PH Operations	Average Aircraft Load	PMAD Passengers	PH Passengers
2002	30,000	4,500	150	30	1.5	113	17
2007	33,000	4,950	165	33	1.5	124	19
2012	36,000	5,400	180	36	2.0	180	27
2022	42,000	6,300	210	42	2.5	263	39

Notes:

Annual Operations (see Table 3-7)

PM Operations are 15% of annual operations

PMAD is 1/30 of PM Operations

PH Operations is 20% of PMAD Operations

PMAD Passengers is PMAD Operations divided by 2, times Average Aircraft Load

PH Passengers is 15% of PMAD Passengers

Source: Dufresne-Henry, Inc., analysis

Design Aircraft

The design aircraft is currently the Pilatus PC-12, but is forecasted to change to the Beech King Air 200 or similar aircraft in the planning years as the role of changes slightly in favor of increase itinerant business use of the facility. The Beech King Air is a twin-engine turboprop aircraft with an approach speed of 105 knots and a wingspan of 55 feet.

Airport Reference Code

The ARC at Biddeford is currently A-II but will change to B-II in the planning years as use of slightly larger turboprop aircraft, such as the Raytheon Beech King Air 200, increases. This change will require a longer runway; otherwise, the ARC will remain A-II.

SUMMARY OF AVIATION FORECASTS

Table 3-13 summarizes the aviation forecast for Biddeford.

Table 3-13
Summary of Forecasts

Segment	2002	2007	2012	2022	Reference
Airport Reference Code	A-II	A-II	B-II	B-II	Page 76
Design Aircraft	PC-12	PC-12	B200	B200	Page 76
Based Aircraft					
Single Engine Reciprocating	40	44	46	53	Table 3-5 Page 71
Multiengine Reciprocating	3	3	2	2	
Turboprop	0	1	3	4	
Turbojet	0	0	1	1	
Helicopter	0	0	0	0	
Total	43	47	52	60	
Local Operations					
Single Engine Reciprocating	19,530	20,645	21,060	22,176	Table 3-8 Page 73
Multiengine Reciprocating	1,470	1,346	936	1,008	
Turboprop	0	449	1,170	1,512	
Turbojet	0	0	0	504	
Helicopter	0	0	0	0	
Total	21,000	22,440	23,400	25,200	
Itinerant Operations					
Single Engine Reciprocating	6,660	7,814	9,072	11,760	Table 3-9 Page 74
Multiengine Reciprocating	900	950	1,008	840	
Turboprop	1,170	1,478	2,016	3,024	
Turbojet	90	106	252	840	
Helicopter	180	211	252	336	
Total	9,000	10,560	12,600	16,800	
Total Operations					
Single Engine Reciprocating	26,190	28,460	30,132	33,936	Table 3-10 Page 74
Multiengine Reciprocating	2,370	2,296	1,944	1,848	
Turboprop	1,170	1,927	3,186	4,536	
Turbojet	90	106	486	1,344	
Helicopter	180	211	252	336	
Total	30,000	33,000	36,000	42,000	
Peak Hour Operations	30	33	37	45	Table 3-12 Page 76
Peak Hour Passengers	17	19	27	42	

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