

**ECONOMIC IMPACT OF  
PUBLIC-USE AIRPORTS  
IN MASSACHUSETTS**

***TECHNICAL REPORT***

*Conducted under the direction of and for:*



**The Massachusetts Aeronautics Commission**

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**AN IMPORTANT MESSAGE FROM THE SECRETARY OF  
TRANSPORTATION AND CONSTRUCTION**

**T**he forty-one public use airports under the supervision of the Massachusetts Aeronautics Commission generate an annual economic impact in excess of \$900 million that would not otherwise occur if these airports did not exist. Of that amount, over \$260 million is paid to nearly 10,000 employees across the state. This is great news for the Commonwealth.



Airports are tremendous catalysts for increased tourism and business development. Nearly a million people each year use these airports to reach businesses, recreation areas and families and they spend approximately \$363 million on food, lodging, recreation and business in the Commonwealth. Our public-use airports provide safe and efficient air service that Massachusetts businesses need to compete in regional, national and global markets.

In addition to creating new jobs and economic opportunities, airports enhance the quality of life in Massachusetts. Thousands of acres of airport land are comprised of open space and wetlands so important to the future of the Commonwealth's ecosystem. Airports support search and rescue operations, emergency medical transportation, and volunteers who provide no-cost air transportation to critically ill patients who would otherwise be unable to travel to receive critical medical treatment. Airports also provide wonderful opportunities for recreation such as parachuting and sightseeing.

Collectively, these airports form an important component of the state transportation system. They offer extensive commercial air passenger service and convenient access to tourism destinations, connect rural communities with major business and medical centers, and relieve congestion at Logan International Airport. Finally, airports generate and sustain significant economic impact.

Thank you for your interest in our public-use airports. I encourage you to use one or more of these airports on your next visit to the Commonwealth.

Kevin J. Sullivan  
Secretary



**AN IMPORTANT MESSAGE FROM THE CHAIRMAN OF THE MASSACHUSETTS AERONUTICS COMMISSION**

**A**irports and aviation are essential elements of today's national economy and transportation system. They provide a quick, efficient, and safe method to move people and goods, and they improve the quality of life for every citizen. As important as the network of airports is to the national welfare, so too are airports to the economy of the Commonwealth of Massachusetts. The Massachusetts Airport System (MAS) provides an integral link to the rest of the country and the world, as well as serving as a significant source of transportation and economic stimulus within Massachusetts.



While most citizens of Massachusetts are quite familiar with Logan International Airport, many are less familiar with the State's other public-use airports. Currently, people who are not directly associated with the Massachusetts Airport System may not be aware of their significant economic contribution. Logan, which has its economic impact report summarized in the appendix, along with Hanscom Field, are run by the Massachusetts Port Authority. The State's other 41 public-use airports are under the purview of the Massachusetts Aeronautics Commission (MAC). In fact, Massachusetts airports are significant generators of revenues, wages, and jobs for the Commonwealth. Not only do the airports themselves generate economic benefits, but also many other non-aviation employers who rely on the Massachusetts Airport System to support their daily business activities also contribute to building the state's economy.

To more fully understand the relationship between Massachusetts public-use airports and the statewide economy, an economic impact analysis was undertaken by MAC. MAC is the state agency responsible for overseeing the Massachusetts Airport System. MAC promotes aviation while establishing and maintaining a safe, efficient airport system to meet the current and future air transportation and economic needs of the Commonwealth. This report summarizes the analysis and highlights the significant economic value of the Massachusetts' system of public-use airports.



This study shows that many people, beyond the immediate environs of each airport, derive significant economic benefits from the daily operation of the airport system. These groups include employees of businesses and corporations who base corporate aircraft at Massachusetts' airports; the commercial and industrial employers whose shipments arrive or depart via the airports; and quite significantly the tourism industry including hotels, restaurants and tourism related activities whose patrons use the general aviation airports to visit Massachusetts tourism destinations.

The primary focus of this study is on the identifiable and quantifiable impacts to the state and local economies resulting from the 41 airports studied. Another goal of this effort was to evaluate some of the less-quantifiable benefits linked with aviation such as quality of life contributions including health, safety, recreation, education, and overall community support.

Finally, this study examines the current status of the taxes and fees that Massachusetts imposes on aviation users and how they compare with the other New England states and New York.

Sherman W. "Whip" Saltmarsh Jr.  
Chairman

## 1. DEFINITION OF ECONOMIC IMPACT

The **Economic Impact** of airports and aviation is the economic effects on business and households of aviation-related economic activity. The key measures of these effects are **output** (revenue or sales), **income** (earnings) and **employment** (jobs). For example, in providing air transportation, the airlines generate local revenues and provide local jobs. The airports, fixed base operators (FBOs), ground transportation companies, hotels, restaurants, car rental agencies, etc., also generate an impact derived from air transportation.

This study divides the economic impact into two major categories: Direct and Induced Impacts. (*Exhibit 1*) **Direct Impacts** are those that are directly related to an airport’s aviation activity and can accrue to both on-airport and off-airport businesses and employees. The on-airport portion of Direct impacts stems from the activity of airport tenants. Examples of these are the expenditures that flow from the airport sponsor/owner, airlines, FBOs, concessionaires and government.

**Exhibit 1**

**Illustration of Economic Impact**

DIRECT ECONOMIC IMPACTS		INDUCED ECONOMIC IMPACTS		TOTAL ECONOMIC IMPACTS
ON-AIRPORT	OFF-AIRPORT	LOCAL	STATE	
Airline/FBO Food & Drink Car Rental Parking Other Ground Transport Fuel Hangar, Tiedown Flight Instruction Flying Clubs Equipment (Avionics, Aircraft) Aircraft Sales, Rentals, Charters Aircraft Maintenance & Parts	Travel Agents Hotel Freight Forwarders Restaurant Convention Centers Tourist Destination	The Local Spending and Re-Spending of Primary Economic Impact Monies	The Total Within-State Spending and Re-Spending of Primary Economic Impact Monies	Primary and Induced

**Direct + Induced = Total Economic Impacts**

There are also Direct Impacts generated by off-airport industries that depend on the airport for a large portion of their sales. While many industries rely on air transportation to some degree, this report primarily focused on visitor-related industries (such as hotel/motels, food and beverage, rental car, entertainment and other retail) as well as off-airport freight and warehousing. It is important to note that on-airport freight or cargo activity was captured in the airport manager and tenant surveys and hence is not double counted here.

**The economic impact estimates presented in this report are conservative.** They are based on measures of direct aviation-related activity occurring at the airports and a fraction of the off-airport spending by visitors (tourists or business clients) that would not occur without the airports (as well as their associated indirect and induced multiplier effects). They also account for off-airport business activity, which is dependent on other uses of aviation, i.e., time-sensitive freight delivery or aerial surveying. However, they do not account for office businesses that rely on airports for all or a portion of their business activity.

Finally, *Induced Impacts* are generated as a consequence of the direct expenditures attributable to aviation (Direct Impacts), and are best understood as the spending and re-spending of these dollars in the local and state economies. The on and off-airport industries mentioned above buy products and services from other industries. As well, their employees spend money on food, housing, recreation, etc. These additional rounds of spending create a “multiplier effect.” This additional impact is referred to in this report as “Induced Impacts;” it is equivalent to what in some other studies are referred to as “Indirect and Induced Impacts.” Induced impact is frequently as large or larger than the Direct impacts.

The magnitude of this additional, induced effect differs depending on the area being studied. The larger the area, the higher the proportion of product service and suppliers that are affected. The multiplier effect on the State is therefore higher than it is on the local area.

The **Total Impact** is the sum of the Direct and Induced Impacts.

## 2. STUDY GOALS AND APPROACH

The approach to this study reflects four major objectives. The *first objective* was to ensure that the study obtained the most accurate, up-to-date data available for individual airports in the Massachusetts Airport System (MAS). To meet this objective, on-site visits to all 41 airports were conducted by senior SH&E staff. Whenever possible, airport managers and tenants were surveyed in person; in situations where this was not possible, the surveys were conducted either by telephone or mail. As a result of this intense survey process, comprehensive information was obtained from 100% of the commercial airports and 91% of the general aviation airports. In cases where airports or tenants did not respond, economic activity was estimated based on statewide patterns and specific activity measures of the non-responding entity.

Augmenting the accuracy achieved in this survey process, a *second study objective* was to ensure that the Induced Impacts be as representative as possible of the actual recycling of aviation dollars in the local and state economies. The credibility of economic analysis is often in question because arbitrary or overly optimistic multipliers are used for determining the Induced Impacts. To address this potential problem, this study used the Regional Input-Output Modeling System (RIMS II) Multipliers developed by the U.S. Department of Commerce, Bureau of Economic Analysis. The RIMS II procedure is designed to accurately identify both the numbers of times that a dollar spent on aviation is re-spent in the local or state economies, and the specific industries, which are affected by the process.

In order to best utilize the results of these findings, and to increase public awareness of the Direct and Induced economic impact of both individual airports and the Massachusetts Airport System on the Commonwealth and its communities, the study was conducted in a highly visible platform. To achieve this *third objective*, an announcement of the study and its goals was sent to all airport managers, and government officials and agencies, in advance; as well as a commitment to sharing all findings when the study was completed. Survey results are detailed in this Summary Report and a brochure with key study findings will be sent to legislators, key transportation policy makers, airports and existing and potential airport users.

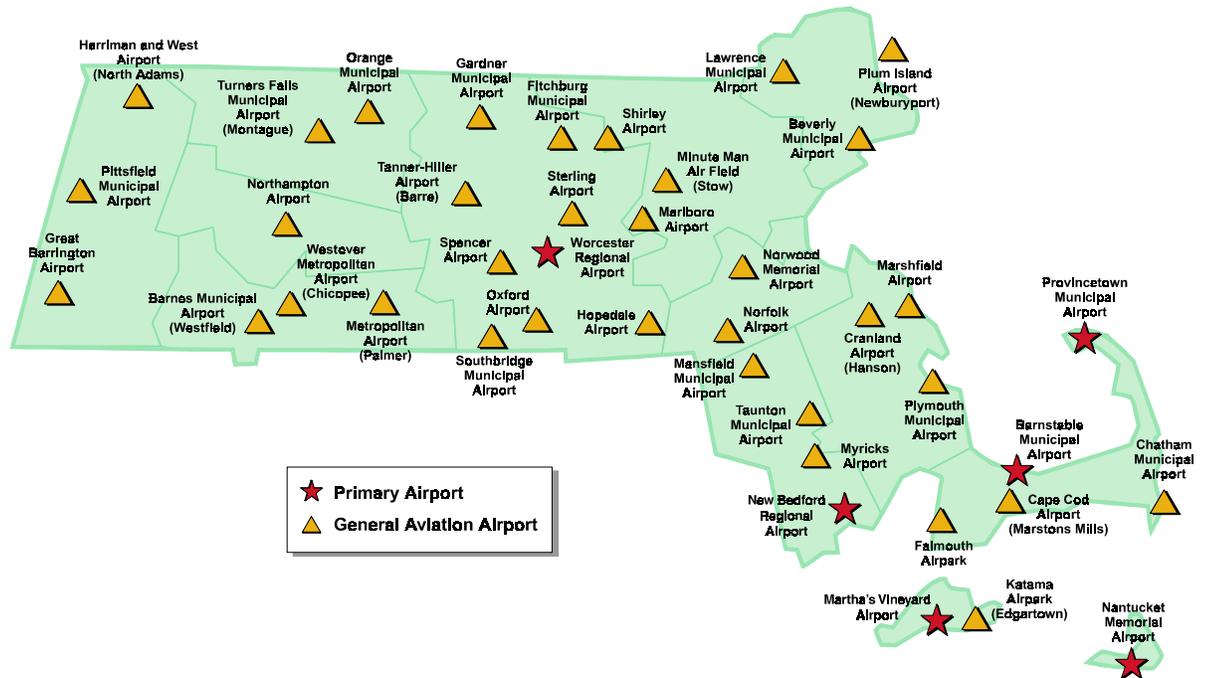


Finally, airports not only generate jobs and revenues; they also are subject to taxes and fees. The *fourth objective* of this survey was to evaluate state taxes and fees that apply to aviation in Massachusetts and then compare them to those of the other New England states and New York in order to determine the competitive impact of Massachusetts' tax and fee structure on aviation. In other words, are the tax and fee structures in other states close by attracting aircraft and causing them to relocate outside of Massachusetts?

### 3. ECONOMIC IMPACTS METHODOLOGY – FIELDWORK AND SURVEY

**A** key ingredient to reliable evaluations of economic impact is accurate data. As well, a major component of a successful statewide economic impact study is the individual airports and user participation. To achieve this goal, a large part of the study effort was spent creating a survey procedure that would ensure the greatest success. The goal of the study team was to obtain accurate information on each of the 41 airports represented. (*Exhibit 2*)

**Exhibit 2**  
**Airports Included in the Study**



#### FIELDWORK SURVEY AND DESIGN

In order to capture the most complete pool of data possible, a substantial emphasis was placed on development of the surveys and creation of the most comprehensive list of relevant businesses and organizations. Key to that effort was gaining the full cooperation and support of the airport managers who, in turn, helped facilitate the gathering of information at their airport. Toward that end, preliminary visits were made to two airports – one primary and one general aviation. The goal was to discuss the survey, share our

approach, gain feedback, and then incorporate the feedback into the final versions of the surveys. SH&E senior staff visited Nantucket and Westover prior to distributing the survey to all managers.

Once the survey was in its final form, each airport manager was contacted, with a letter from the Massachusetts Aeronautic Commission announcing the study, expressing the importance of participation, and introducing the SH&E study team. The initial contact also addressed the types of information required by the survey effort. As a result, many of the airport managers were able to help pull together needed information in advance. Following this initial contact, individual site visits were scheduled and conducted by senior SH&E staff. All 41 airports were personally visited and 35 managers were personally interviewed.

A second survey, designed specifically for tenants of airports was mailed to all businesses that occupy space on airport properties throughout the Commonwealth. Whenever possible the tenants were visited when the survey team met with airport managers. Tenants were asked to return completed surveys in the mail, those that didn't were contacted by telephone in an effort to gain survey data. Additionally, surveys were sent to all major businesses identified as relying on the local airport and to registered aircraft owners. Finally, members of the survey team conducted passenger surveys in person at the six primary airports and at six general aviation airports. This activity was timed to coincide with the height of the tourism season.

## **RESULTS OF THE ON-AIRPORT SURVEYS AND DATA COLLECTION EFFORTS**

Overall, the survey effort was quite successful, with 100% response among the six primary airports surveyed, and a 91% response rate among General Aviation airports. (*Exhibit 3*)

**Exhibit 3**  
**Survey Response Rates**

	Surveys Distributed	Surveys Returned	Percent Returned
<b>Airport Managers</b>			
Commercial	6	6	100%
General Aviation	35	32	91%
<b>Aircraft Owners</b>			
Business	925	112	13%
Non-Business	1,692	515	30%
<b>Tenants</b>	244	150	61%
<b>Visitors</b>			
Commercial	432	432	100%
General Aviation	66	66	100%

Of the three general aviation airports that did not respond, previous MAC and public data was used to make general assumptions. Tenant response rates were quite high; of the 244 surveyed, over 60% responded. Data from aircraft owners was more difficult to gather; however, the team was successful in gathering over 600 completed surveys. Results of visitor surveys were much more successful at those locations where the survey team collected the data in person and the travelers were using commercial airlines – 66 surveys were collected from visitors traveling on general aviation aircraft versus 432 collected from visitors traveling on commercial airlines. Due to the nature of visitor trends, all six primary airports were surveyed at the height of the tourist season.

### **ECONOMIC IMPACT METHODOLOGY**

In order to estimate each airport's individual impact on its region, worksheets were developed with categories for documentation of individual airport's on- and off-airport activities. Data from these worksheets was then used to calculate Induced Impacts (using the RIMS II multiplier) and finally to calculate total impacts. These worksheets were also used to help calculate the economic impact of the entire Massachusetts Airport System on the statewide economy.

## **DEVELOPING DIRECT IMPACT**

### **On-Airport Economic Impact**

On-airport data collection included revenues, payroll, and employees for any business that directly benefits from the airports' presence. These are businesses that would not exist if the airport weren't open. Typical on-airport industries include:

- Airport Sponsors & Owners
- Air Carriers
- Fixed Base Operators – FBOs
- Auto Rental Companies
- Concessionaires – Parking Lots, Restaurants, Retail
- Government Agencies – Federal Aviation Administration (FAA), Massachusetts Aeronautics Commission (MAC), County & Municipal Offices

During times when interviews were being scheduled with airport management, tenant lists were requested. These lists were further expanded during on-site visits. Each tenant was mailed a survey designed to categorize certain information such as the nature of their aviation activity and their expenditures – revenue, wages and employees. Employees were broken out by full and part-time. For purposes of this study, two part-time employees were counted as one full-time employee.

### **Estimation of Missing On-Airport Data**

Despite the comprehensive survey process, it would be unrealistic to expect a 100 percent response rate. In fact, the response rates of 93 percent achieved of airports and more than 90 percent of activity were excellent considering the scope of the survey effort (41 airports and over 500 visitors). The dominant methodology was to gather information through the survey process.

However there were cases where tenants were not willing to provide all information that was requested. In the few cases where data was missing, one of two approaches was taken. Where there was some data available, ratios developed from existing information such as revenue to wages, wages to employees were applied to estimate the missing information. If a tenant

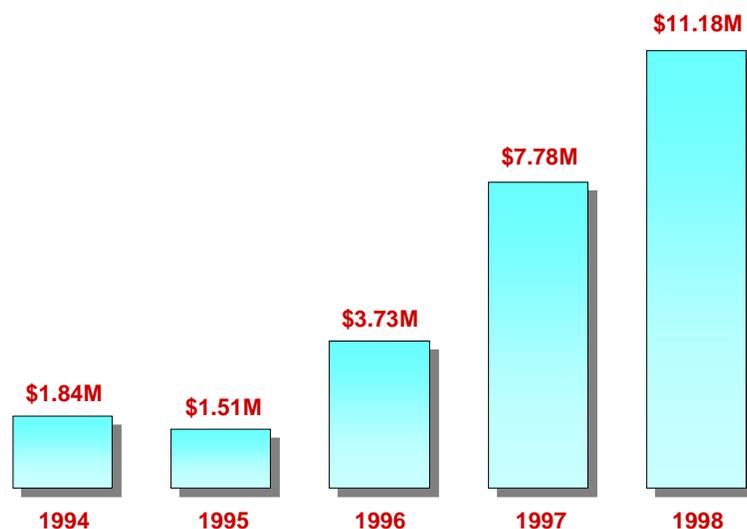
failed to respond at all, analysts consulted Dun & Bradstreet which reports revenues and employees for businesses throughout the country. Wages were then determined using the database ratios.

### Capital Investment Impact

Beyond the day-to-day operations at an airport, at times there are expansions and improvements to upgrade and accommodate the airports' changing needs. These capital investments can produce a significant economic impact, especially in terms of wages and taxes.

In the survey process, airport sponsors/owners were asked to provide any capital expenditure made on behalf of the airport over the past three years. The multi-year approach was taken because of the inherent unevenness in capital investment, where one year there could be a significant terminal upgrade and the next year there will be no capital investment. Therefore an average of the three years was taken. It should be noted that the estimates reported in this document underestimate the true impact of construction and upgrades because private investment activities, such as those conducted by tenants, are not included. The capital investments reported included all money spent by the airport sponsor/owner whether its source was federal, state and/or local. *Exhibit 4* shows State Grants that have been awarded for capital investments at the 41 airports under MAC's purview.

**Exhibit 4**  
**State Grants for Public-Use Airports**



## **Off-Airport Economic Impact**

Although the bulk of the study effort went to the accurate portrayal of on-airport impacts, there is also a substantial level of impacts associated with several airport dependent off-site industries. While almost all industries rely on air transportation to some degree, this report focused primarily on visitor-related industries such as hotel/motels, food and beverage, rental car, entertainment and related retail.

Visitor related data was based on actual commercial and general aviation passenger surveys. Given that only a portion of visitor expenditures is related to aviation, a 50% and 100% estimate was used in order to arrive at low and high estimates of the amount of visitors that would still visit the destination (and spend money) even if the airports weren't available.

While the primary analysis has documented the economic role of airport activities and visitor spending, there is another class of economic effects associated with off-airport business activities that depend directly on general aviation for freight shipments or for other non-passenger services. To address this, the study also surveyed business aircraft owners about how their businesses would be affected if they no longer could use their local airports.

## **Visitor-Related Impacts**

Visitor-related impacts are those expenditures that air visitors make on hotels, restaurants, entertainment, rental cars and retail during their visits. Expenditures were based upon an estimate of commercial and general aviation visitors to each airport.

For the primary airports, airline visitors were estimated upon reported number of passengers according to the U.S. Department of Transportation Origin and Destination database. Half of the total passengers were considered arrivals. Of the arrivals, a percentage was considered to be visitors (based on interviews with airport managers). On the Cape and Islands, 80 percent of inbound passengers were estimated to be visitors while at New Bedford and Worcester that estimate was 40 percent. These percentages were meant to address seasonal issues as well. During the "season" a higher percentage of arrivals are visitors but a lower percentage applies to the "off-season."

For general aviation visitors at primary and general aviation airports, estimates were based on the number of itinerant operations. Itinerant operations are those that are non-training flights that arrive or depart an airport. Analysis shows that approximately 75 percent of the operations on the Cape and Islands were generated by visitors. For the rest of the state, a conservative 33 percent estimate was applied. Through general aviation surveys and airport manager interviews, estimates on average aircraft size were determined. Actual visitor numbers were determined by taking a 60 percent load factor (60 percent of the seats on average were estimated to be full) and applying it to the number of aircraft seats at each airport.

Once visitor numbers were determined by airport, SH&E applied spending averages from the primary and general aviation visitor surveys. These averages separate the Cape and Islands from the rest of the state, as spending per visitor tends to be higher on the Cape and Islands.

### **Off-Airport Aviation Activity**

There are currently 925 general aviation aircraft registered to businesses in Massachusetts, nearly the same number as a decade ago when MAC conducted an in-depth survey of that group.<sup>1</sup> The results of that survey showed that time-sensitive freight delivery accounted for just 6% of total business aircraft use in the state, but 18% of the use by electronics/computer industries and 23% of the use by wholesalers. The survey also showed that aerial surveying accounted for just 4% of total business aircraft use in the state, but 23% of the use by agricultural services and 24% of the use by utilities. The agricultural uses were primarily fish spotting and crop dusting. The new survey which was sent out to owners of business aircraft supports that these percentages are still approximately correct.

The off-airport business value of those non-passenger uses of general aviation aircraft were totaled just for the key industries that are highly dependent on them – electronics/computer, wholesalers and agricultural services and utilities. The impact on utilities was deleted from the total, since those businesses would remain in Massachusetts regardless of airports. The impact on the other three industries was estimated using the survey information on lost business activity and additional expenses that would be incurred without airport access, with additional adjustments upward for inflation and

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<sup>1</sup> Source: Business Benefits of General Aviation Access, August, 1988

downward to account for the fact that roughly half of those activities involved on-airport related expenses.

The other uses of general aviation business aircraft (accounting for 90% of their use according to the earlier MAC survey) are associated with transporting clients, staff or contractors, flight training or other non-business uses. The economic impact of those activities is already covered by the accounting of airport/FBO business activity and outside visitor spending in Massachusetts). The results indicated that 23% of the businesses owning their own corporate aircraft, representing over \$215 million statewide, could no longer stay in business. However, *all* of those businesses were on-airport aviation services (aircraft charter, leasing, passenger and freight aviation, flight training and maintenance services), whose economic impact was already counted in the analysis of on-airport business activity.

The rest of the corporate aircraft owners were off-airport businesses that required general aviation facilities for incoming parts, outgoing deliveries or aerial surveying. The affected businesses are primarily manufacturers (of high value computer and electronic equipment) and businesses in the agricultural, fishing and real estate services (reliant on aerial surveying). The results indicated that 16% of the corporate aircraft owners would relocate with a loss of some business sales, and 11% would relocate without any loss of business sales. The remaining 50% of corporate aircraft owners would adjust by substituting other transportation modes, making fewer trips and/or relying on more distant airports. This includes 39% of corporate aircraft owners which could do so with no loss of sales and 11% which would expect to endure some sales loss.

The study found that the direct shrinkage in business sales for corporate aircraft owners would be \$438 million, which is 0.4% of the total business sales of this group. Additional corporate aircraft owners would not shrink, but would relocate their business activities. If all of the business relocations are to areas outside of Massachusetts, then the total Direct Impact of such a hypothetical situation would be \$878 million and the full impact, including indirect supplier and induced spending impacts, would be \$2.1 billion.

## DEVELOPING INDUCED IMPACTS

Each of the impacts discussed to this point in this section – on-airport and off-airport – comprise what is termed in this study as the Direct Economic Impacts. The effects on these Direct Impact Dollars do not stop here but, rather, the “multiplier” must still be applied, and is the subject of the next section.

The aviation related industries covered in this study also buy goods and services from other industries, which in turn do the same. Employees of each of these industries spend their wages on food, housing, services, recreation, etc. These additional rounds of spending are referred to in this study as the *Induced Economic Impact*. Some other studies refer to this as Indirect and Induced Impacts. The process of money “cycling” through the local economy is often referred to as the *Multiplier Effect*.

For example, if an FBO employee earns \$100 at an airport and uses it to buy \$100 worth of groceries, both the employee and the grocer have benefited from the \$100 earnings. The grocer can then use the money to pay his suppliers and employees, all of whom are slightly better off because of the original expenditure by the FBO employee. These successive waves of employment, payroll, and re-spending induce impacts that continue within the economy. For each wave of spending beyond the first round, a portion of the re-spending takes place outside the state resulting in economic leakage.

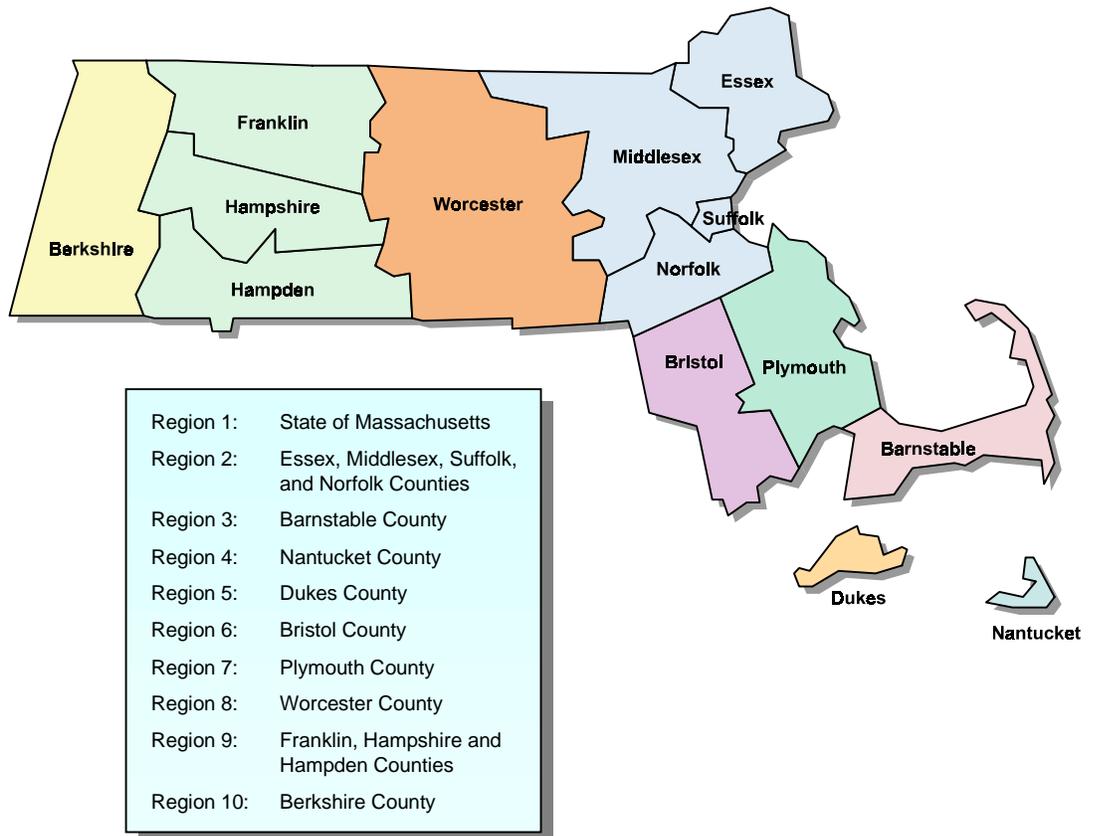
In order to calculate the Induced Impacts to communities and the state as a whole, regional multipliers from RIMS II (Regional Input-Output Modeling System) were used. RIMS II was developed by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce and intended specifically for this type of application. RIMS II is widely used in both the public and private sector. For example, the Department of Defense uses RIMS II to estimate the regional impacts of military base closings, while the private sector has used it to evaluate the regional impacts of shopping malls and theme parks. This methodology has become the preferred means for calculating Induced Impacts, as it offers a significantly greater degree of accuracy than most other methodologies. RIMS II multipliers can be estimated for any region composed of one or more counties and for any industry or groups of industries in the national Input-Output (I-O) table.

Briefly, for each industry, an I-O table shows the distribution of the inputs purchased and the outputs sold. The I-O table in RIMS II is derived from two data sources:

- The Bureau of Economic Analysis (BEA) national I-O table, which shows the input and output structure of nearly 500 U.S. industries; and
- The BEA regional economic accounts, which are used to adjust the national I-O table in order to reflect a region’s industrial structure and trading patterns.

Ten sets of RIMS multipliers were obtained from the BEA and were used in this study. To accurately reflect inter-industry relationships, these were grouped by county and statewide. (*Exhibit 5*)

**Exhibit 5**  
**Massachusetts Study Regions**



Four specific steps were taken to calculate the Induced Impact and show the total impact: (An example of which is shown in Appendix 1)

**Step 1** – Direct data was collected from all 41 public-use airports.

**Step 2** – RIMS II multipliers were determined according to the countywide multipliers selected.

For example, Marshfield Airport is located in Plymouth County, hence, the Plymouth County’s multiplier was applied to accurately reflect the unique economic attributes of that county.

**Step 3** – The RIMS II multipliers were applied to the Direct Impact activity.

**Step 4** – A consolidated worksheet was created to show both Direct and total impacts.

## QUALITATIVE IMPACTS

The Massachusetts Aeronautics Commission’s goal was to measure the economic impacts of each airport in the Massachusetts Airport System (MAS) in order to demonstrate its importance to local and state economies. MAC also sought to inventory the qualitative benefits that result from the Massachusetts Airport System. These are the benefits that must be considered when evaluating an airport’s worth to its community and the state aviation system. These are the impacts that don’t allow for dollar values but are still critically important to recognize.

Airport sponsors/owners and tenants were surveyed to find out just how their airport contributes to the quality of life and health of the Commonwealth’s residents. Surveys were also distributed to all registered aircraft owners in Massachusetts. Owners of business and non-business aircraft were asked their reaction to the hypothetical closing of their base airport and its affect on their business sales. (See Appendix 4 for samples of the surveys)



## 4. RESULTS OF THE ECONOMIC IMPACT ANALYSIS

Applying the methodology described in the previous chapter, SH&E developed estimates of the economic impact of each of the State's 41 primary and general aviation public use airports on their locales as well as the total impact of all of the airports on the State. This chapter presents the impacts.

### INTERPRETATION OF OVERALL STATEWIDE BENEFIT

This study estimates the economic impact (or effect) of airports in terms of how many jobs and dollars flow through the State's economy as a consequence of their operation. It does not estimate how the State's economy might be affected by any future scenarios of airport changes.

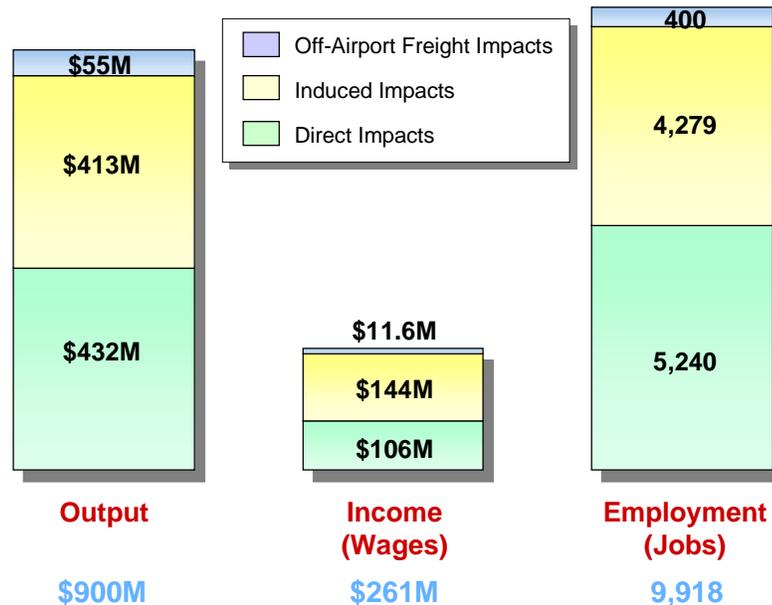
In its accounting of the overall economic effect of airports, several aspects of these estimates should be noted. First, it is important to note that the accounting of airport impacts in this report was restricted to just an accounting of the incremental *costs incurred* or *dollars spent* by businesses and passengers using those airports. That represents a low-side estimate of the actual *value to businesses and individuals* using these airports. For instance, the value of a timely shipment of medical supplies, transplant organ or computer parts may be significantly more than the amount of the direct expenses associated with that shipment.

In addition, it is also important to note that the accounting of airport impacts in this report covered only off-airport passenger expenditures by visitors (non-residents), and then included only the *fraction* of this visitor spending that was estimated to be lost without the airports. That is an appropriate means of calculating the *marginal contribution* of airports to county and state economies. However, it yields substantially smaller impact numbers than would result if *all* spending by airport visitors (representing a measure of the *gross level of economic activity* associated with airports) was included. The latter method, while yielding inflated estimates of the airport impact, is used in some airport impact studies.

## STATEWIDE IMPACT

Overall, airports and aviation in Massachusetts generate significant local revenues, wages and jobs. Aviation contributes \$900 million in local economic activity, over \$260 million in local wages and 9,918 jobs. *Exhibit 6* shows the composition of those estimates. Of the total output of \$900 million, 48% comes from on-airport and off-airport (visitor related) activity. Nearly 53% of the jobs associated with public-use airports result from Direct Impacts as does almost 41% of the associated usage.

**Exhibit 6**  
**Statewide Economic Impacts**  
*Total Massachusetts Airport System*



Note: Complete details of the Statewide Economic Impacts can be found in Appendix 2.

While all airports contribute to the total statewide airport impact, the impact of individual airports on local areas was also examined. *Exhibit 7* shows the local impacts of each airport; therefore the figures do not add up to the total statewide impact. *Exhibit 7a* shows how the individual airports contributed to the statewide total effect.

**Exhibit 7**  
**Countywide Economic Impacts by Airport**  
*Output, Income and Employment*

Airport	Primary Economic Impacts			Total Economic Impacts		
	Output	Income	Employment	Output	Income	Employment
<b>Commercial</b>						
Barnstable Municipal (Hyannis)	82,987,152	20,441,888	1,155	130,006,396	37,075,089	1,562
Martha's Vineyard	34,913,442	9,501,618	552	53,181,832	16,212,909	752
Nantucket Memorial	87,569,570	23,988,224	1,386	128,289,404	37,163,626	1,779
New Bedford Regional	18,938,218	4,905,598	203	27,452,673	5,476,506	294
Provincetown Municipal	23,907,152	6,814,022	403	37,410,863	10,805,489	518
Worcester Regional	19,387,597	4,933,268	175	29,501,506	6,666,960	276
<b>General Aviation</b>						
Barnes Municipal (Westfield)	25,447,707	5,553,529	174	41,224,118	13,556,954	425
Beverly Municipal	6,421,105	1,594,115	71	10,939,372	2,373,757	118
Cape Cod (Marstons Mills)	800,449	166,595	11	1,225,587	323,467	17
Chatham Municipal	3,006,573	611,065	27	4,580,112	1,226,884	50
Cranland (Hanson)	413,356	85,234	3	612,570	127,051	4
Falmouth Airpark	262,148	79,107	3	402,396	107,362	5
Fitchburg Municipal	5,486,295	1,239,528	49	8,353,813	1,926,673	75
Gardner Municipal	2,265,447	416,106	15	3,545,840	755,376	25
Great Barrington	1,539,912	375,166	13	2,067,144	441,526	15
Harriman and West (North Adams)	4,530,166	937,480	36	6,356,969	1,332,408	55
Hopedale	378,523	78,305	3	563,624	116,724	3
Katama Airpark (Edgartown)	580,156	169,332	11	884,075	269,225	15
Lawrence Municipal	17,154,288	3,766,446	129	30,681,729	7,141,756	222
Mansfield Municipal	1,788,577	414,982	27	2,440,299	393,236	37
Marlboro	1,234,486	241,727	10	2,213,493	505,485	15
Marshfield	6,581,848	368,448	22	9,777,609	1,978,427	62
Metropolitan (Palmer)	831,140	176,437	9	1,307,150	360,687	16
Minute Man Air Field (Stow)	2,092,315	428,443	20	3,773,894	869,353	33
Myricks (Berkley)	519,265	111,936	9	695,443	102,462	12
Norfolk	193,841	60,169	3	364,517	97,037	4
Northampton	4,923,395	1,103,066	51	8,018,853	2,204,592	95
Norwood Memorial	27,394,654	5,781,644	206	49,040,618	11,410,052	387
Orange Municipal	2,727,673	688,917	41	4,368,274	1,245,009	58
Oxford	988,335	179,820	9	1,587,394	337,946	15
Pittsfield Municipal	3,278,500	1,194,242	43	4,753,826	1,073,084	64
Plum Island (Newburyport)	1,566,967	296,002	11	2,847,892	632,407	22
Plymouth Municipal	16,490,938	2,990,246	135	25,546,358	7,101,879	255
Shirley	915,645	157,998	8	1,470,443	306,935	11
Southbridge Municipal	335,288	94,106	6	534,866	138,779	9
Spencer	171,260	91,786	4	254,530	55,928	6
Sterling	213,208	98,011	5	341,842	97,152	7
Tanner-Hiller (Barre)	491,019	110,193	8	744,240	172,161	12
Taunton Municipal	10,847,013	2,298,287	68	16,289,782	5,363,908	161
Turners Falls (Montague)	283,432	80,777	6	460,457	134,365	8
Westover Metropolitan (Chicopee)	4,194,132	1,001,211	47	6,659,783	1,869,428	62

\*Source: Database Products, O&D Plus



**Exhibit 7a**  
**Statewide Economic Impacts by Airport**  
*Output, Income and Employment*

Airport	Primary Economic Impacts			Total Economic Impacts		
	Output	Income	Employment	Output	Income	Employment
<b>Commercial</b>						
Barnstable Municipal (Hyannis)	82,987,152	20,441,888	1,155	165,498,723	48,653,853	1,907
Martha's Vineyard	34,913,442	9,501,618	552	68,929,890	20,350,801	846
Nantucket Memorial	87,569,570	23,988,224	1,386	173,384,750	51,977,663	2,215
New Bedford Regional	18,938,218	4,905,598	203	36,640,326	10,545,604	371
Provincetown Municipal	23,907,152	6,814,022	403	47,347,588	14,030,287	617
Worcester Regional	19,387,597	4,933,268	175	36,991,459	10,121,971	373
<b>General Aviation</b>						
Barnes Municipal (Westfield)	25,447,707	5,553,529	174	48,754,787	15,595,132	486
Beverly Municipal	6,421,105	1,594,115	71	12,432,149	3,912,411	146
Cape Cod (Marstons Mills)	800,449	166,595	11	1,517,109	410,704	21
Chatham Municipal	3,006,573	611,065	27	5,747,769	1,589,695	61
Cranland (Hanson)	413,356	85,234	3	781,528	211,404	7
Falmouth Airpark	262,148	79,107	3	499,529	136,760	6
Fitchburg Municipal	5,486,295	1,239,528	49	10,420,686	2,849,349	104
Gardner Municipal	2,265,447	416,106	15	4,334,668	1,092,374	35
Great Barrington	1,539,912	375,166	13	2,910,323	793,110	25
Harriman and West (North Adams)	4,530,166	937,480	36	8,703,829	2,158,766	70
Hopedale	378,523	78,305	3	711,813	189,489	5
Katama Airpark (Edgartown)	580,156	169,332	11	1,156,069	345,280	17
Lawrence Municipal	17,154,288	3,766,446	129	32,370,278	8,751,076	267
Mansfield Municipal	1,788,577	414,982	27	3,391,238	924,935	50
Marlboro	1,234,486	241,727	10	2,321,956	618,521	18
Marshfield	6,581,848	368,448	22	12,440,398	3,301,642	100
Metropolitan (Palmer)	831,140	176,437	9	1,573,844	429,100	18
Minute Man Air Field (Stow)	2,092,315	428,443	20	3,993,046	1,049,380	34
Myricks (Berkley)	519,265	111,936	9	977,231	260,746	12
Norfolk	193,841	60,169	3	364,517	97,037	4
Northampton	4,923,395	1,103,066	51	9,628,450	2,667,696	110
Norwood Memorial	27,394,654	5,781,644	206	51,791,587	13,973,218	459
Orange Municipal	2,727,673	688,917	41	5,222,015	1,477,529	58
Oxford	988,335	179,820	9	1,908,222	471,986	20
Pittsfield Municipal	3,278,500	1,194,242	43	6,355,922	1,591,037	89
Plum Island (Newburyport)	1,566,967	296,002	11	2,997,011	762,364	24
Plymouth Municipal	16,490,938	2,990,246	135	32,428,607	11,797,334	375
Shirley	915,645	157,998	8	1,764,353	427,971	15
Southbridge Municipal	335,288	94,106	6	654,359	195,329	9
Spencer	171,260	91,786	4	322,870	86,600	8
Sterling	213,208	98,011	5	413,061	129,227	9
Tanner-Hiller (Barre)	491,019	110,193	8	936,785	260,074	12
Taunton Municipal	10,847,013	2,298,287	68	21,181,078	8,049,502	233
Turners Falls (Montague)	283,432	80,777	6	547,121	159,156	10
Westover Metropolitan (Chicopee)	4,194,132	1,001,211	47	7,933,028	2,209,605	72

\*Source: Database Products, O&D Plus

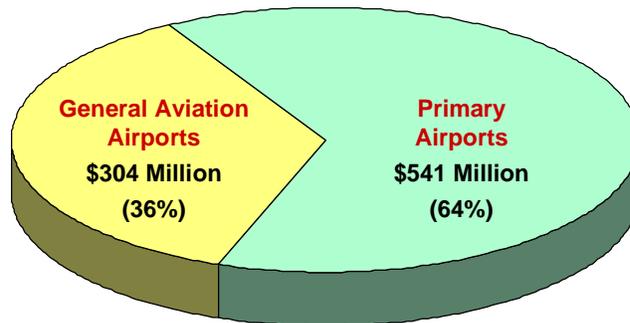
Note: Includes capital investment impacts of \$16.7 million of output, \$5.2 million of payroll and 200 jobs and off-airport freight impacts of \$55 million of output, \$11.6 million of payroll and 400 jobs.

These numbers represent the relative impact of each airport to the statewide system. They do not reflect the impact of each on its local area nor the effect of airport changes on the State economy.

It is generally true that the Induced economic impacts on a large region will exceed the Induced Impacts on a subregion. Thus the Induced Impacts generated by each airport on the State of Massachusetts should be greater than the Induced Impact generated on the airports' immediate locale. This can be seen by looking at the total statewide impact of \$900 million of output, \$261 million of income and 9,918 jobs, all of which are greater than the sum of the local impacts using countywide multipliers.

*Exhibit 8* illustrates the distribution of economic impacts by type of airport. The primary airports (those with regularly scheduled passenger service exceeding 10,000 enplanements per year) generate nearly two-thirds of the impact while the general aviation airports are responsible for just over one-third of the economic impact. It is important to note that even the smallest general aviation facilities have a material economic impact on their area.

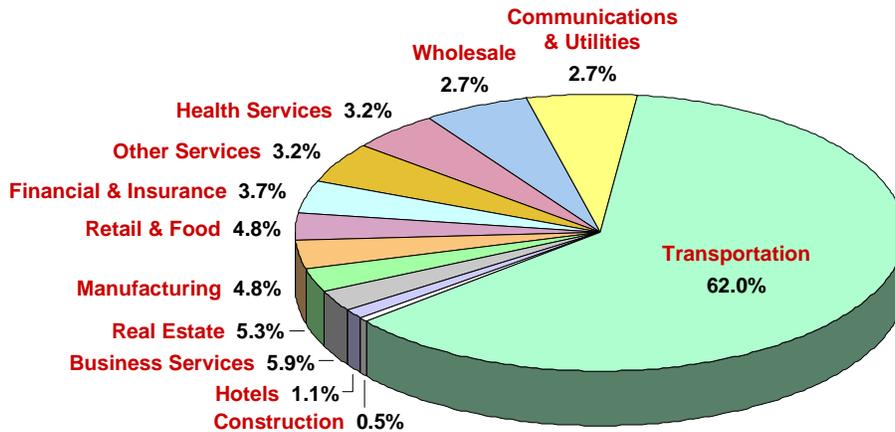
**Exhibit 8**  
**Distribution of Statewide Economic Impacts**



Note: Absolute numbers shown are rounded. The percentages are due to actual impacts as shown in the appendix.

Exhibit 9 shows the business beneficiaries of aviation spending in the State of Massachusetts according to the RIMS II model. This exhibit includes both Direct and Induced Impacts.

**Exhibit 9  
Business Beneficiaries of Aviation Spending**



## PRIMARY AIRPORTS

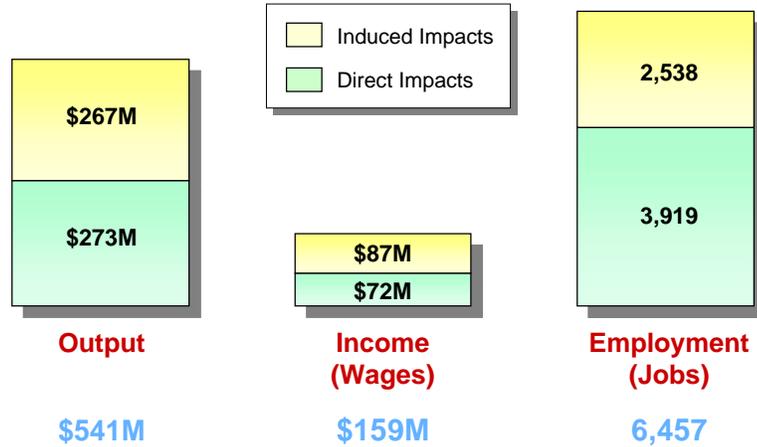
Massachusetts' six primary airports (excluding Logan International Airport<sup>2</sup>) account for the majority of the economic impact on the State. The six study airports are Barnstable/Hyannis, Martha's Vineyard, Nantucket, New Bedford, Provincetown and Worcester. Total economic impacts can be broken down into several major categories including on-airport, off-airport, off-site, capital investment and Induced Impacts. (*Exhibit 10*)

<sup>2</sup> The economic impact of Logan International Airport is summarized in Appendix 5. It was not included in this report as Logan is owned and operated by the Massachusetts Port Authority while the 41 study airports are overseen by the Massachusetts Aeronautics Commission.

**Exhibit 10**

**Summary Statewide Economic Impacts**

*Massachusetts Primary Airports*



Note: Complete details of the Statewide Economic Impacts can be found in Appendix 2. Absolute numbers may not add up due to rounding, see appendix for detail.

**On-Airport Impacts**

On-airport economic impact for primary airports consists of the impacts of the airport sponsor/owner, airlines, FBOs, concessionaires and government. Overall, on-airport impacts total \$103 million in economic activity or business sales (wages, supplies, revenues, profits, etc.), \$21 million in payroll and wages and 851 jobs.

**Capital Investment Impacts**

On average, \$6 million per year over the past three years was spent on construction at primary airports. This total yielded \$2 million in wages and 43 jobs. These estimates truly underestimate the impact of construction because they do not include private investments by airlines, FBOs and concessionaires; they only represent monies spent by the airport sponsor/owner.

**Off-Site Impacts**

Airports also generate considerable economic impacts indirectly – through industries dependent on the airport for their business. While almost all

industries rely on air transportation to some degree, SH&E focused on visitor-related industries such as hotel/motels, food and beverage, rental car, entertainment and other retail. Again, impacts are truly underestimated since adequate information was not available for off-airport air freight and warehousing.<sup>3</sup>

Overall, off-site impacts of primary airports accounted for \$164 million in impacts, \$49 million in wages and 3,025 jobs.

### **Total Primary Airport Economic Impact**

The on-airport and off-site industries buy goods and services from other industries, which, in turn also purchase goods and services. Employees of all of these industries spend money on food, housing, services and entertainment. This cycling of initial expenditures is called the Induced Impact or the multiplier effect. Induced impact is frequently as large or larger than the Direct Impacts.

The total economic impact of primary airports including both Direct and Induced Impacts is \$541 million, \$159 million in wages and 6,457 jobs.

Primary airports have a major impact on Massachusetts. Their contributions to serving the state's growing tourism industry are evident when one looks at the operations at Barnstable/Hyannis, Martha's Vineyard, Nantucket and Provincetown. Indeed, it is often the case during the summer that there are more daily operations at Nantucket than at Logan in Boston.<sup>4</sup> New Bedford and Worcester offer strategic advantages for their passengers – many of whom would prefer not to drive over an hour (with no traffic) to and from Boston for commercial scheduled service.

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<sup>3</sup> The majority of freight and warehousing impacts are captured in the on-airport impacts. However it is certain that there are some off-site activities that we were not able to measure.

<sup>4</sup> An aircraft operation is defined as a take-off or landing.

## GENERAL AVIATION AIRPORTS

The Commonwealth’s 35 general aviation public-use airports make significant contributions to the State. These airports include:

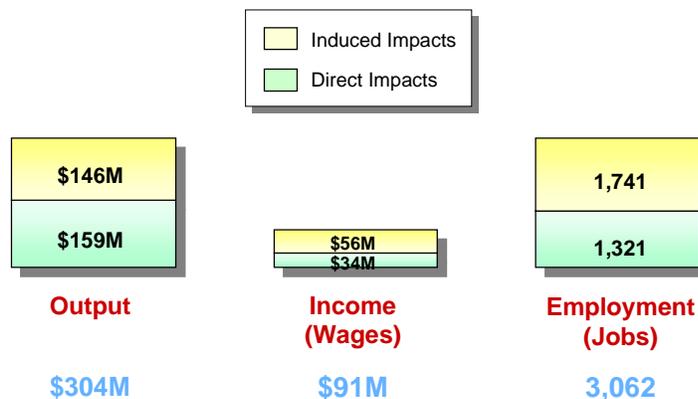
Barnes Municipal (Westfield)	Lawrence Municipal	Pittsfield Municipal
Beverly Municipal	Mansfield Municipal	Plum Island (Newburyport)
Cape Cod (Marstons Mills)	Marlboro	Plymouth Municipal
Chatham Municipal	Marshfield	Shirley
Cranland (Hanson)	Metropolitan (Palmer)	Southbridge Municipal
Falmouth Airpark	Minute Man Air Field (Stow)	Spencer
Fitchburg Municipal	Myricks (Berkley)	Sterling
Gardner Municipal	Norfolk	Tanner-Hiller (Barre)
Great Barrington	Northampton	Taunton Municipal
Harriman and West (North Adams)	Norwood Memorial	Turners Falls (Montague)
Hopedale	Orange Municipal	Westover Metropolitan (Chicopee)
Katama Airpark (Edgartown)	Oxford	

It should be noted that the totals presented in this section are for the State’s general aviation airports as general aviation activity at the primary airports is counted in the primary airports’ totals. *Exhibit 11* shows the economic impacts of Massachusetts’ general aviation airports.

### Exhibit 11

#### Statewide Economic Impacts

*Massachusetts General Aviation Airports*



Note: Complete details of the Statewide Economic Impacts can be found in Appendix 3. Absolute numbers shown are rounded.

### **On-Airport Impacts**

The major on-airport industries are the airport sponsor/owner, FBOs, concessionaires and government. Overall, on-airport impacts totaled \$146 million in economic activity, \$30 million in wages and 1,108 jobs.

### **Capital Investment Impacts**

On average, \$2 million per year over the past three years was spent on construction at primary airports. This total yielded \$1 million in wages and 28 jobs. These estimates also underestimate the true impact of construction because they do not include third-party private investments, they only represent monies spent by the airport sponsor/owner as well as MAC and the FAA.

### **Off-Site Impacts**

As with primary airports, general aviation airports generate considerable economic impacts indirectly – through industries dependent on the airport for their business. Again, this study primarily focused on visitor-related industries such as hotel/motels, food and beverage, rental car, entertainment and other retail to determine off-site impacts.

Tourism is a major industry in the Berkshires as well as on the Cape and Islands. Where visitors to the Cape and Islands have access to primary airline service, general aviation airports give visitors who might otherwise not spend time in other areas not served by scheduled airlines the chance to do so. In all parts of the state, business and leisure visitors depend on general aviation airports for convenience.

Overall, off-site impacts of general aviation airports accounted for \$10 million in impacts, \$3 million in wages and 185 jobs.

### **Total General Aviation Airport Economic Impact**

The total economic impact of general aviation airports including both Direct and Induced Impacts is \$304 million, \$91 million in wages and 3,062 jobs. To help put these numbers in perspective, exclusive of the visitor-related impacts, each general aviation operation generates roughly \$235 in economic activity and \$70 in wages. From a different perspective, on average, there are 14 jobs in the state for every 10 based aircraft at general aviation airports.

## AIR VISITORS

A significant portion of the economic impact of airports and aviation comes from the expenditures of air visitors. Estimates based on the methodology described on page 14 show over 850,000 air visitors in the Commonwealth. Approximately 53% arrived by general aviation and 47% by commercial airlines. Many more visitors arrived in Massachusetts during the study period, however this study measures the impacts of those that would not have arrived if their airport were unavailable.

The impact of their off-site expenditures (hotels, rental cars, food, entertainment, etc.) is dependent upon the existence of the local airport. Without the airport, these impacts would be missed. These visitor expenditures are not meant to be representative of all visitor expenditures in an area – rather just those that are airport-dependent. *Exhibits 12, and 13* (on the following pages) illustrate just how these visitor expenditures break down for each airport and by type of aircraft.

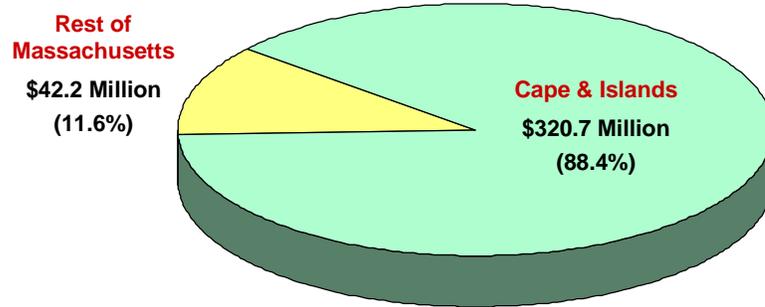
As shown in *Exhibit 14*, the average length of stay was slightly longer for business travelers using airports within the Massachusetts Airport System (MAS) than for leisure visitors. Business visitors spent more money than their non-business counterparts and had more passengers per aircraft. Not surprisingly, the airports with the highest number of air visitors were on the Cape and Islands.

**Exhibit 12**  
**Economic Impact of General and Commercial Aviation in Massachusetts**  
*Annual Visitor Expenditures*

<b>Airport</b>	<b>Estimated Annual Visitors</b>	<b>Annual # of Days Stayed</b>	<b>Annual Visitor Expenditure</b>
<b>Cape &amp; Island</b>			
Barnstable Municipal (Hyannis)	255,543	1,228,312	100,290,801
Cape Cod (Marstons Mills)	1,838	5,345	312,570
Chatham Municipal	1,995	5,804	339,362
Falmouth Airpark	1,129	3,284	192,007
Katama Airpark (Edgartown)	6,300	18,327	1,071,668
Martha's Vineyard	86,372	538,307	48,327,621
Nantucket Memorial	205,443	1,394,208	128,286,116
Provincetown Municipal	<u>198,824</u>	<u>647,472</u>	<u>41,915,293</u>
<b>Subtotal</b>	<b>757,444</b>	<b>3,841,059</b>	<b>320,735,438</b>
<b>Rest of Massachusetts</b>			
Barnes Municipal (Westfield)	3,773	6,288	636,041
Beverly Municipal	17,290	28,816	2,914,613
Cranland (Hanson)	1,519	2,532	256,068
Fitchburg Municipal	3,602	6,003	607,130
Gardner Municipal	1,176	1,960	198,246
Great Barrington	2,254	3,757	379,972
Harriman and West (North Adams)	1,964	3,273	331,072
Lawrence Municipal	20,289	33,815	3,420,239
Mansfield Municipal	7,166	11,944	1,208,064
Marlboro	228	380	38,410
Marshfield	3,516	5,860	592,674
Metropolitan (Palmer)	1,960	3,267	330,411
Minute Man Air Field (Stow)	1,715	2,858	289,109
Myricks (Berkley)	227	378	38,204
New Bedford Regional	23,681	50,174	6,701,506
Northampton	10,045	16,742	1,693,355
Norwood Memorial	27,563	45,938	4,646,401
Orange Municipal	14,112	23,520	2,378,958
Oxford	1,617	2,695	272,589
Pittsfield Municipal	5,145	8,575	867,328
Plum Island (Newburyport)	2,358	3,930	397,525
Plymouth Municipal	15,435	25,725	2,601,985
Southbridge Municipal	3,430	5,717	578,219
Spencer	490	817	82,603
Sterling	588	980	99,123
Tanner-Hiller (Barre)	1,862	3,103	313,890
Taunton Municipal	2,720	4,533	458,445
Turners Falls (Montague)	1,960	3,267	330,411
Westover Metropolitan (Chicopee)	2,131	3,552	359,245
Worcester Regional	<u>27,012</u>	<u>63,228</u>	<u>9,161,429</u>
<b>Subtotal</b>	<b>206,825</b>	<b>308,565</b>	<b>42,183,267</b>
<b>Total Massachusetts</b>	<b>964,268</b>	<b>1,644,441</b>	<b>362,918,705</b>

Note: Neither numbers of visitors nor annual aircraft operations – two key components to estimating annual visitors and visitor expenditures – were made available by Hopedale, Norfolk and Shirley airports.

**Exhibit 13**  
**Annual Visitor Expenditures**



**Exhibit 14**  
**General Aviation Visitor Profile**



## RESULTS OF THE QUALITATIVE IMPACTS

While the previous section focuses on quantifiable impacts as a result of the Massachusetts' public use airports, it's important to recognize the impacts that can't always be measured in dollars and cents. These are the impacts that sometimes dramatically affect the lives of Bay State residents. The availability of public use airports for medical flights can not be assigned a value high enough when a life hangs in the balance. On a less dramatic note, many of these airports allow for educational opportunities, environmental observations, the preservation of open space and recreational activities that greatly enhance the quality of life in Massachusetts. (*Exhibit 15*)

In addition, these airports provide important convenience for many business and leisure travelers who would have to otherwise put up with long drive times and inconvenient schedules in order to reach their destinations. Of those business aircraft owners surveyed, nearly 57 percent said that if their base airport were no longer available that their business sales would decrease by an average of 20 percent. Over 31 percent of business aircraft owners surveyed said they'd use the next closest airport if their base airport closed, 18 percent said they'd substitute other modes of transportation and 19 percent said they'd relocate their business.

Non-business aircraft owners were equally supportive of their base airports as 40 percent said they'd relocate their aircraft while 20 percent said they'd sell their aircraft. For airport users, these airports are critical to their business and leisure activities. And considering the economic impact that is generated by their activity, these airports enhance the quality of life for people far beyond aircraft owners.

*Exhibit 15* summarizes the many diverse and special activities that enhance the quality of life for communities surrounding public-use airports throughout the Commonwealth.

Exhibit 15

Summary of Special Activities at Public-Use Airports

No.	Type	Airports	Parachuting / Recreation Flying	Open Space / Wetland / Woodland Area	Educational / Career Training	Search & Rescue	Flight Training	Emergency Medical	VIP / High Profile Visitors	Staging Area for Community Events	Aerial Inspections	Aerial Advertising / Banner Towing
1	GA	Barnes Municipal (Westfield)	X	X	X		X	X	X		X	
2	Primary	Barnstable Municipal (Hyannis)	X	X	X		X	X	X			
3	GA	Beverly Municipal		X		X	X					X
4	GA	Cape Cod (Marstons Mills)	X	X	X		X			X	X	X
5	GA	Chatham Municipal	X		X	X	X	X	X	X		
6	GA	Cranland (Hanson)	X		X							
7	GA	Falmouth Airpark	X	X				X				
8	GA	Fitchburg Municipal	X	X	X	X	X	X	X			X
9	GA	Gardner Municipal	X	X		X	X	X			X	
10	GA	Great Barrington	X		X		X				X	
11	GA	Harriman & West (North Adams)	X	X		X	X		X	X	X	
12	GA	Hopedale		X			X		X		X	
13	GA	Katama Airpark (Edgartown)	X									
14	GA	Lawrence Municipal	X	X	X		X	X			X	X
15	GA	Mansfield Municipal	X	X	X	X	X	X	X	X	X	X
16	GA	Marlboro	X	X	X	X	X	X				X
17	GA	Marshfield	X	X	X	X	X	X	X	X		
18	Primary	Martha's Vineyard	X	X			X	X				
19	GA	Metropolitan (Palmer)	X	X		X	X	X			X	
20	GA	Minute Man Air Field (Stow)	X	X	X	X	X	X	X	X	X	X
21	GA	Myricks (Berkley)	X	X						X		X
22	Primary	Nantucket Memorial	X	X	X	X	X	X	X	X		
23	Primary	New Bedford Regional	X	X			X	X			X	
24	GA	Norfolk	X	X			X			X		X
25	GA	Northhampton	X	X	X	X	X	X	X		X	X
26	GA	Norwood Memorial	X	X	X	X	X	X	X	X		
27	GA	Orange Municipal	X	X	X		X	X	X	X		
28	GA	Oxford										
29	GA	Pittsfield Municipal			X		X		X	X	X	X
30	GA	Plum Island (Newburyport)	X	X		X	X	X	X	X	X	X
31	GA	Plymouth Municipal	X	X	X	X	X	X	X			X
32	Primary	Provincetown Municipal	X	X	X		X	X			X	
33	GA	Shirley	X	X	X	X	X			X		
34	GA	Southbridge Municipal	X	X	X	X	X		X	X	X	X
35	GA	Spencer	X	X	X		X					
36	GA	Sterling	X	X			X		X	X		
37	GA	Tanner-Hiller (Barre)	X	X					X			
38	GA	Taunton Municipal	X	X			X				X	X
39	GA	Turner Falls (Montague)	X	X	X	X	X	X	X	X	X	X
40	GA	Westover Metropolitan (Chicopee)	X	X	X	X			X	X		
41	Primary	Worcester Regional	X	X			X		X	X	X	

Source: SH&E, Inc.



**Exhibit 15**  
(continued)

No.	Type	Airports	Air Shows	Shipping / Perishable Goods	Agricultural Spraying	Freight / Cargo Activity	Traffic / News Activity	Corporate Business Activity	Environment Reporting	Aerial Photography / Surveying	Museums	Police / Law Enforcement	Location for Community Facilities, Utilities, Airport Reg. Services	Public Charters	Other
1	GA	Barnes Municipal (Westfield)	X		X		X	X				X	X		Aircraft Repair
2	Primary	Barnstable Municipal (Hyannis)	X	X	X										
3	GA	Beverly Municipal				X	X	X	X			X			Fish Spotting, Foliage Flights
4	GA	Cape Cod (Marstons Mills)	X					X	X						Major Training for Military
5	GA	Chatham Municipal	X		X	X	X	X	X				X		
6	GA	Cranland (Hanson)													EAA Chapter 279
7	GA	Falmouth Airpark	X				X			X					
8	GA	Fitchburg Municipal	X	X	X	X	X	X	X	X			X		
9	GA	Gardner Municipal	X				X	X	X	X					
10	GA	Great Barrington	X				X	X	X	X			X		
11	GA	Harriman & West (North Adams)	X				X	X	X	X			X		
12	GA	Hopedale		X	X		X	X	X	X		X	X		Industrial Park
13	GA	Kalama Airpark (Edgartown)													
14	GA	Lawrence Municipal	X		X	X	X	X	X	X		X	X		
15	GA	Mansfield Municipal	X	X			X	X	X	X					
16	GA	Marlboro		X	X	X	X	X	X	X	X	X	X		EAA Activities
17	GA	Marshfield	X		X	X	X	X	X	X			X		Aircraft Maintenance, Aircraft Sales
18	Primary	Marthas Vineyard		X	X		X	X	X	X					
19	GA	Metropolitan (Palmer)	X		X		X	X							
20	GA	Minute Man Air Field (Stow)	X	X	X	X	X	X	X	X	X	X	X		
21	GA	Myricks (Berkley)	X	X					X						
22	Primary	Nantucket Memorial		X	X		X	X	X			X			Fuel and Municipal Vehicle Storage
23	Primary	New Bedford Regional	X	X	X		X	X	X	X			X		
24	GA	Norfolk	X			X	X			X		X			
25	GA	Northhampton	X	X	X	X	X	X	X	X			X		
26	GA	Norwood Memorial	X	X	X	X	X	X	X	X			X		
27	GA	Orange Municipal	X				X	X	X	X			X		
28	GA	Oxford													
29	GA	Pittsfield Municipal	X		X		X	X	X	X			X		
30	GA	Plum Island (Newburyport)	X	X			X	X	X	X			X		
31	GA	Plymouth Municipal	X	X			X					X			
32	Primary	Provincetown Municipal	X	X	X		X	X	X	X			X		Car Rental, Tourism
33	GA	Shirley	X		X	X	X	X	X	X			X		
34	GA	Southbridge Municipal	X				X	X	X	X			X	X	
35	GA	Spencer				X	X	X	X						
36	GA	Sterling	X				X	X							
37	GA	Tanner-Hiller								X					A/C Maint., Upholstery, Gliders, Camping
38	GA	Taunton Municipal	X		X		X	X	X	X		X	X		
39	GA	Turner Falls (Montague)	X	X			X	X	X				X		
40	GA	Westover Metropolitan (Chicopee)	X				X			X			X		
41	Primary	Worcester Regional	X	X	X	X	X			X			X		

Source: SH&E, Inc.

## 5. INDIVIDUAL AIRPORT PROFILES

**THIS SECTION PROFILES EACH  
PUBLIC-USE AIRPORT IN THE  
MASSACHUSETTS AIRPORT SYSTEM  
(MAS)**