

## **FORECAST OF FUTURE ACTIVITY**

The forecast of activity identifies the number of based aircraft at each public use airport in Michigan and the number and type of operations at each of those facilities for the base year (1998), and each of the target years (2005, 2010, and 2020).

Forecasting aviation activity in the state of Michigan is an integral part of the *MASP 2000*. Forecasts allow planning officials to anticipate and prepare for changes in aviation activity and the demand that these changes place on the system's infrastructure. The *MASP 2000* is designed to identify and assess development needs at airports that will play an essential role in the economic and social development of Michigan. Forecasts will also assist in the identification of airports in need of capital improvements and provide a guide for programming federal and state development funds.

To predict aircraft activity, *MASP 2000* focuses on two important measures of activity: based aircraft and aircraft operations. This chapter examines historical trends in based aircraft and operations activity levels, describe forecasting methods and the growth factors expected over the next 20 years, and comment on trends in aviation as a whole in the state of Michigan.

### **Forecast Trends**

Prior to generating growth forecasts for based aircraft and operations in the state of Michigan, several other forecast sources were identified and assessed. In addition to examining the FAA's Terminal Area Forecast, a variety of other sources including the National Business Aviation Association, General Aviation Manufacturers Association (GAMA), and the National Air Transportation Association (NATA) were explored.

**FAA Growth Outlook**

The FAA publishes a Terminal Area Forecast (TAF) for each airport in the National Plan of Integrated Airports System (NPIAS) using historical based aircraft counts as the primary indicator of activity. The FAA's General Aviation forecast projects nationwide a 1 percent annual growth in the general aviation fleet through the year 2009; to 212,960 aircraft. General aviation hours flown are projected to increase by 1.4 percent. Active pilots are forecasted to increase by 2.1 percent. Aircraft operations at FAA control tower airports throughout the US will see an annual increase of 2.1 percent. Non-towered airports, which represent about 94 percent of all airports in Michigan, are forecasted to have no growth in based aircraft or operations over the FAA forecast period. Detailed historic records at Michigan non-towered airports indicate that a "no growth" alternative for these airports is unlikely. Rather an MDOT growth outlook based on historical trends that project a modest increase in based aircraft and operations is more likely to occur.

**MDOT Growth Outlook**

MDOT pursued an alternate forecast that is felt to more accurately model expected growth in Michigan's general aviation community. These forecasts are based on the application of linear regression to the historical activity levels in both based aircraft and operations. Trends were established using 1988-1998 data gathered through field inspections, the Aircraft Traffic Counter Program and Control Tower Activity Reports and information contained in the Transportation Management System (TMS) and the Aviation Information Management System (AIMS). Understanding that past trends are not always accurate indicators of the future, some qualitative analysis of the numerical results was undertaken to calibrate the models and to modify extreme anomalies based on field experience.

In order to forecast based aircraft and total operations at each airport, study participants concluded that separate regression analyses be run for individual FAA group classifications within each planning region of the state. Airports in the C-II/III and D-III classifications are so few in number, that it was decided to combine them into one statewide group to run the analyses. In each case, based aircraft analysis and operations analysis were run separately resulting in unique forecast curves for each airport classification and region of the state. A detailed discussion of the linear regression model used for

forecast preparation can be found in the *MASP 2000 Technical Supplement*.

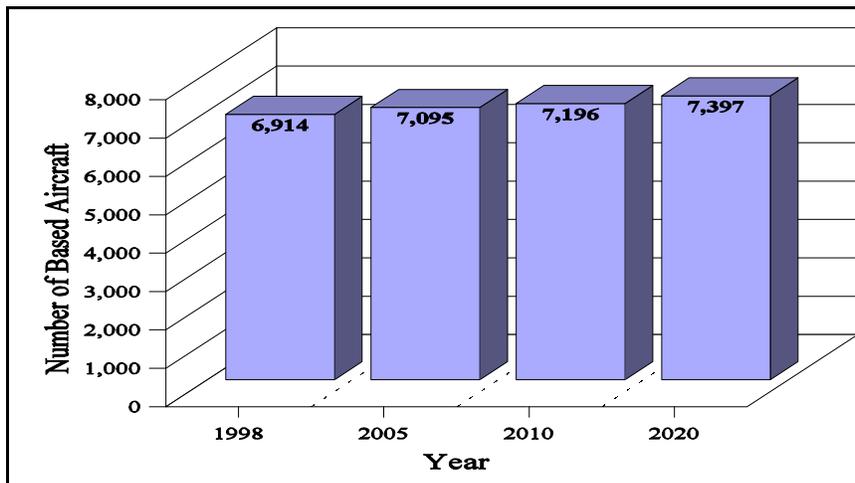
**MASP Forecasts**

Using the linear regression technique discussed previously, the anticipated growth in the number of based aircraft and total operations was determined for the years 2005, 2010, and 2020.

**Based Aircraft**

The number of based aircraft in Michigan is expected to grow 7.0 percent between 1998 and 2020 to almost 7,400.

**Figure 1  
Based Aircraft Historic and Forecast Trends**

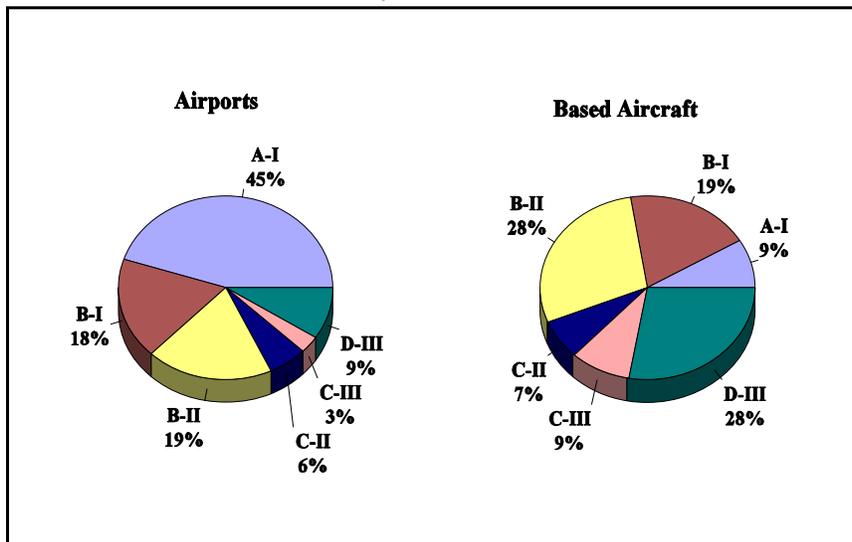


Over the past 5 years, the number of based aircraft has decreased slightly from 6,957 aircraft in 1994 to 6,914 in 1998 -- a 0.6 percent decline. The regression analysis indicates that this decline is reversing and modest increases are anticipated by the end of the forecast period. The number of based aircraft at each airport is detailed in Appendix A.

Year	Based Aircraft	Pct Change from 1998
1998	6,914	na
2005	7,095	2.6
2010	7,196	4.1
2020	7,397	7.0

The distribution of based aircraft by airport classification is displayed in Figure 2.

**Figure 2  
Based Aircraft Distribution, 2020**

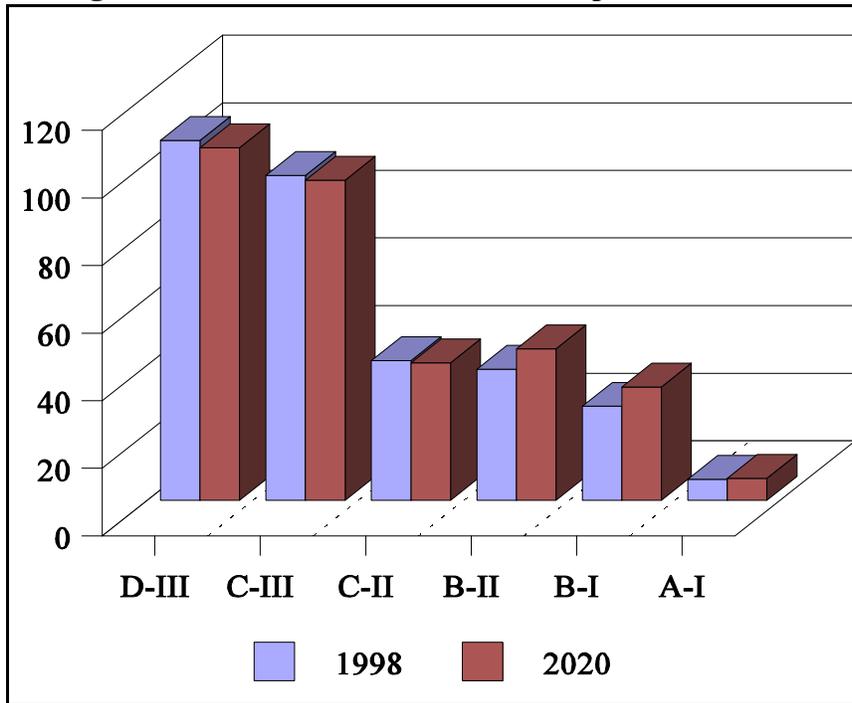


Although C and D category airports represent only 18 percent of the total airports, they have 44 percent of the total based aircraft. At the other extreme, A-I airports represent 45 percent of the total number of airports but have just 9 percent of the based aircraft.

Figure 3 displays the average number of based aircraft by airport classification. As expected, the most developed airports, the D-III and C-III facilities, have the greatest average number of based aircraft with more than 100 per airport. At the opposite end of the spectrum the least developed airports, A-I facilities, have the lowest average number of based aircraft with 6 per airport. From 1998 to 2020 it is interesting to note that the greatest growth in average number of based aircraft will occur at the “B” category airports, with the other

airport categories remaining somewhat stable. It appears that as small single engine aircraft are replaced with higher performance aircraft at the most developed airports, those smaller aircraft will be shifting to the “B” category airports.

**Figure 3**  
**Average Number of Based Aircraft Per Airport, 1998-2020**

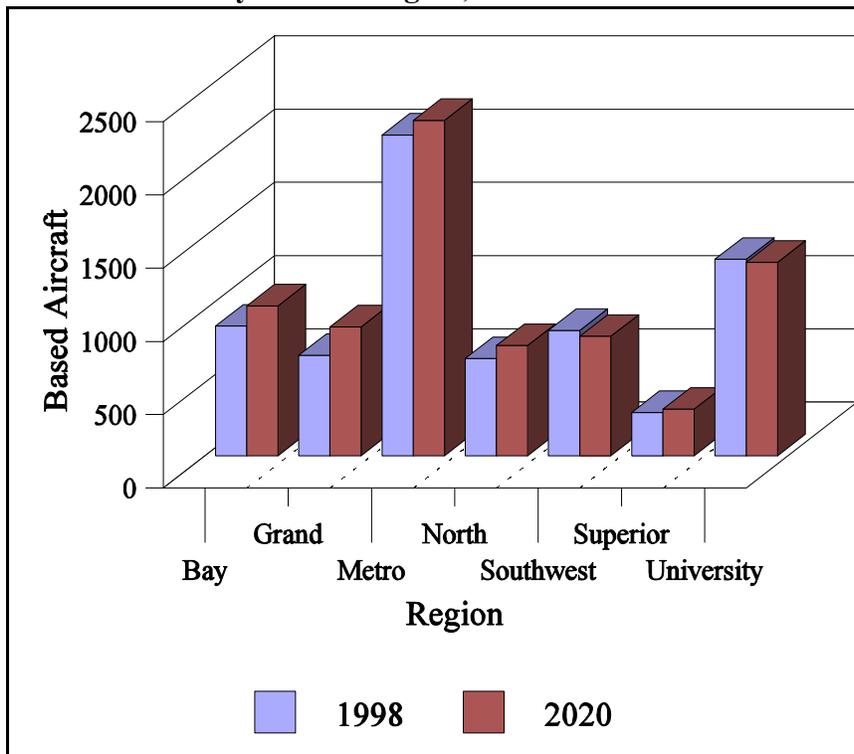


The data in Table 6 indicates that B-I and B-II airports are expected to show the greatest growth in based aircraft while the larger C and D class airports are expected to experience a slight decrease in based aircraft.

Airport Class	Total Based Aircraft by Airport Classification				Percent Change 1998-2020
	1998	2005	2010	2020	
A-I	663	693	693	692	4.4
B-I	1,166	1,239	1,295	1,409	20.8
B-II	1,787	1,890	1,947	2,060	14.5
C-II	495	493	492	488	(1.4)
C-III	673	670	668	663	(1.5)
D-III	2,130	2,110	2,102	2,085	(2.1)
Total	6,914	7,095	7,196	7,397	7.0

Figure 4 displays the trends in based aircraft by MDOT region.

**Figure 4  
Based Aircraft By MDOT Region, 1998-2020**



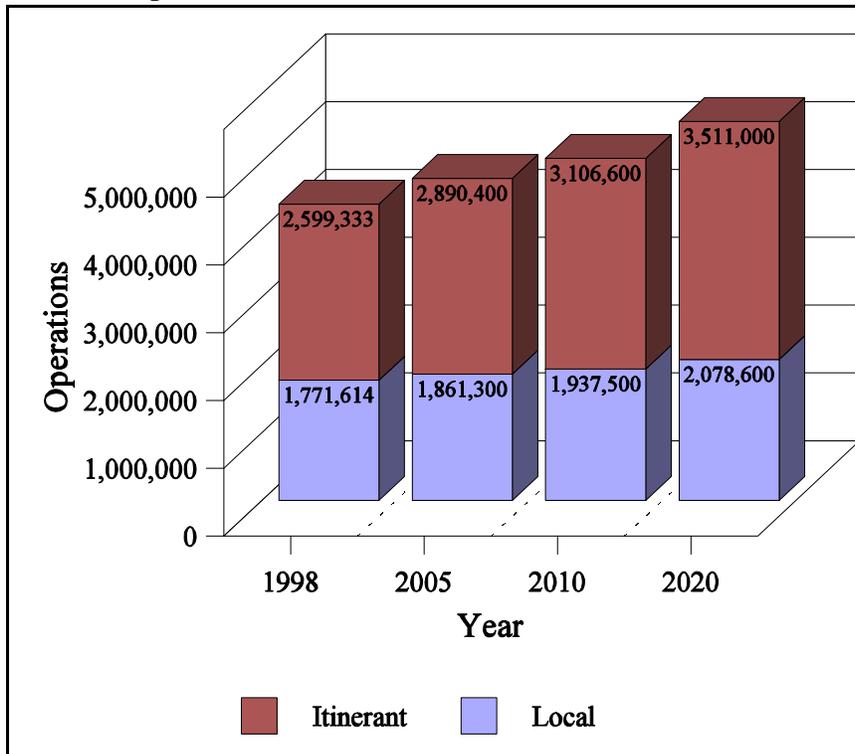
Of the seven MDOT regions, only the University and Southwest regions are expected to exhibit a reduction in the total number of based aircraft. The remaining regions will experience growth with the greatest increase occurring in the Grand region.

Region	Total Based Aircraft by MDOT Region				Percent Change 1998-2020
	1998	2005	2010	2020	
Bay	886	927	959	1,023	15.5
Grand	685	745	790	879	28.3
Metro	2,189	2,213	2,238	2,290	4.6
North	663	717	729	752	13.4
Southwest	855	851	839	816	(4.6)
Superior	295	304	309	317	7.5
University	1,341	1,338	1,332	1,320	(1.6)
Total	6,914	7,095	7,196	7,397	7.0

**Operations**

The number of aircraft operations in Michigan are expected to grow by 27.9 percent between 1998 and 2020 to 5.6 million total operations.

**Figure 5  
Aircraft Operations Historic and Forecast Trends**

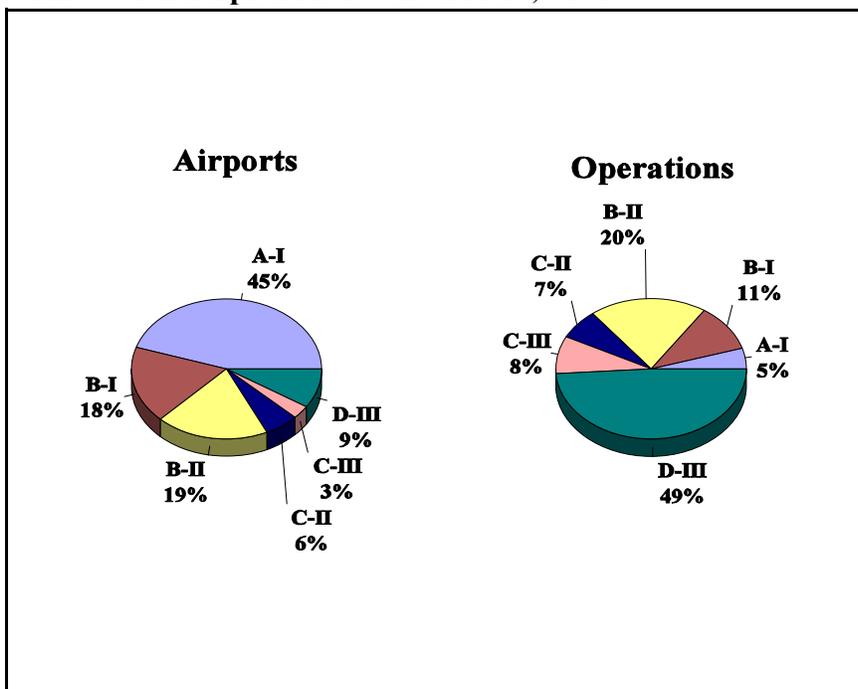


While based aircraft figures have remained stable in recent years, aircraft operations have grown from 3.9 million in 1988 to 4.4 million in 1998 -- a 13.2 percent increase. During this period itinerant operations grew at a faster pace, 15.0 percent, than local operations which grew by just 10.7 percent. This trend is expected to continue where the growth in itinerant operations will outpace the growth in local operations -- 35.1 percent to 17.3 percent respectively. The statewide forecast figures for itinerant, local and total aircraft operations are identified in the following table. The total number of current and forecasted operations at each of the 236 airports is found in Appendix A.

Year	Local Operations	Itinerant Operations	Total Operations	Pct Change from 1998
1998	1,771,614	2,599,333	4,370,947	na
2005	1,861,300	2,890,400	4,751,700	8.7
2010	1,937,500	3,106,600	5,044,100	15.4
2020	2,078,600	3,511,000	5,589,600	27.9
Pct Change 1998-2020	17.3%	35.1%	27.9%	

The distribution of aircraft operations by classification of airport is displayed in Figure 6.

**Figure 6  
Total Aircraft Operations Distribution, 2020**



As before, C and D category airports represent only 18 percent of the total public use airports but have 64 percent of total operations. At the opposite extreme, A-I airports with 45 percent of the total airports, have just 5 percent of total aircraft operations.

**Figure 7**  
**Total Operations Per Airport, 1998-2020**

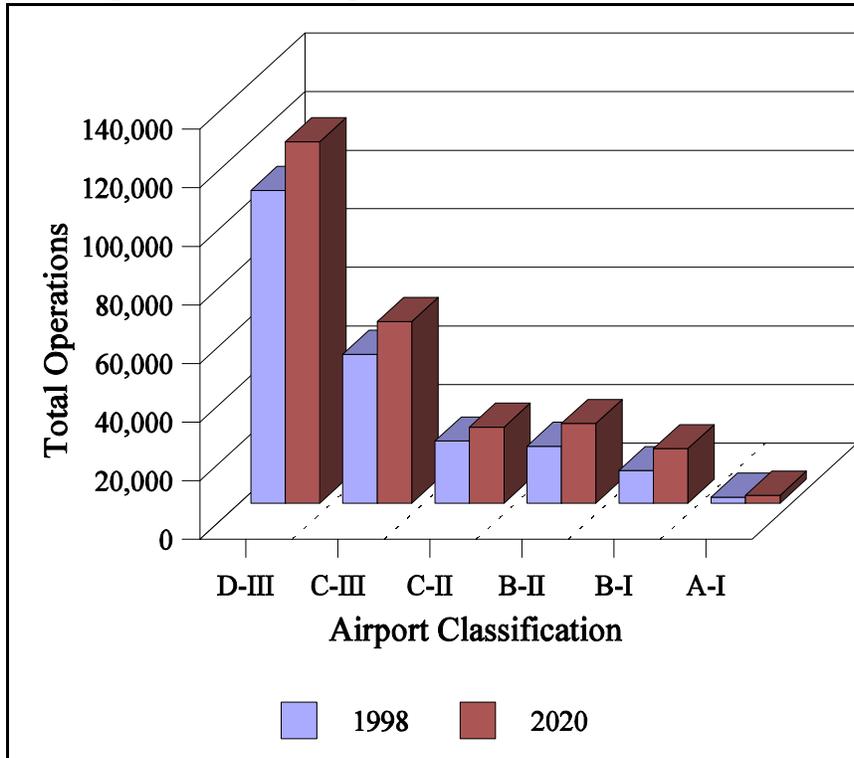


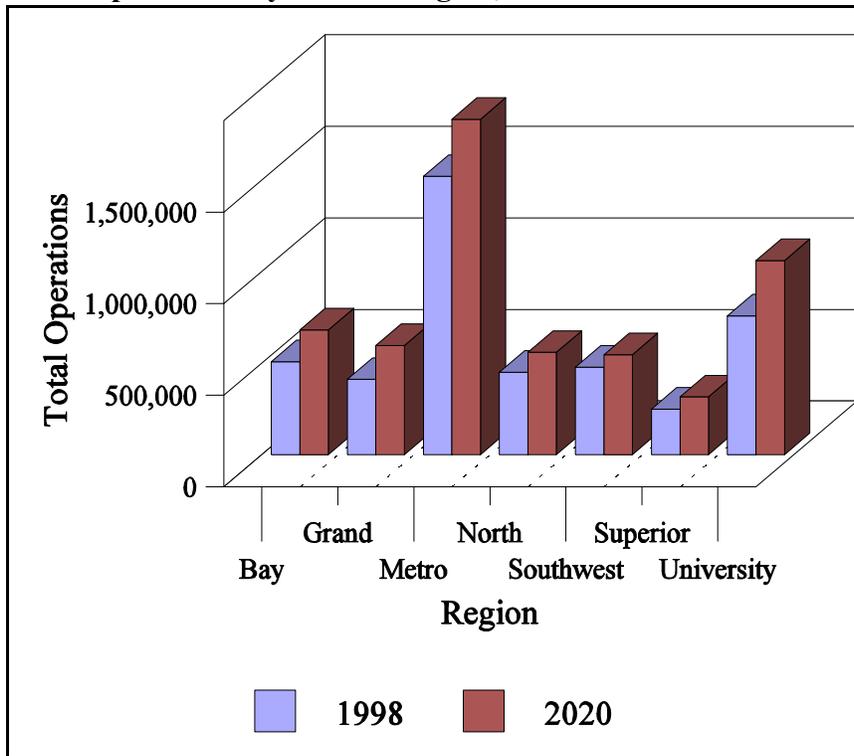
Figure 7 displays the average number of total operations by airport classification. As expected, the most developed airports have the greatest number of total aircraft operations. Airports in category D-III average more than 100,000 total annual operations. Airports in category A-I average approximately 2,000 total annual operations. Aircraft operations in all airport classifications are forecasted to increase.

<b>Table 9 Operations Forecast By Airport Classification</b>					
<b>Class</b>	<b>1998</b>	<b>2005</b>	<b>2010</b>	<b>2020</b>	<b>Pct Change 1998-2020</b>
A-I	221,560	259,000	268,800	288,200	30.1
B-I	466,440	561,300	635,300	783,000	16.8
B-II	893,959	1,014,500	1,107,100	1,253,000	40.2
C-II	297,378	305,200	324,000	362,800	22.0
C-III	355,799	365,300	387,600	434,300	22.1
D-III	2,135,811	2,246,400	2,321,300	2,468,400	15.6
<b>Total</b>	<b>4,370,947</b>	<b>4,751,700</b>	<b>5,044,100</b>	<b>5,589,700</b>	<b>27.9</b>

Although D-III airports will continue to contribute the largest number of operations over the forecast period, the smaller B-I and B-II class airports will each experience an increase of more than 300,000 total operations.

Figure 8 displays the trends in total operations by MDOT region.

**Figure 8**  
**Total Operations By MDOT Region, 1998-2020**



All regions are expected to have an increase in total operations. The Grand region, followed closely by the University region, is expected to show the greatest overall growth in aviation activity.

Region	1998	2005	2010	2020	Pct Change 1998-2020
Bay	507,381	565,700	605,500	681,900	34.4
Grand	410,191	473,700	514,800	595,600	45.2
Metro	1,519,229	1,607,000	1,682,300	1,831,900	20.6
North	449,816	481,700	521,100	559,000	24.3
Southwest	477,886	507,000	519,100	546,000	14.3
Superior	248,578	270,900	285,200	314,900	26.7
University	757,866	845,700	916,100	1,060,400	39.9
<b>Total</b>	<b>4,370,947</b>	<b>4,751,700</b>	<b>5,044,100</b>	<b>5,589,700</b>	<b>27.9</b>