

Cape Cod Canal Transportation Study.

Bourne, Plymouth, Sandwich, Wareham.

Third Working Group Meeting.

Sandwich Town Hall.
September 10, 2015.

Welcome and Introductions.

- MassDOT:
 - Ethan Britland – Project Manager.
- US Army Corps of Engineers.
- Study Team:
 - Ed Hollingshead, AICP - Team Project Manager (FST),
 - Heather Ostertog, P.E. – Transportation Engineer (FST),
 - Frank Mahady, Economist, FXM Associates,
 - Sudir Murthy, P.E., TrafiInfo,
 - Ken Buckland, AICP – Public Involvement (Cecil Group).

Agenda.

- Welcome and Introductions.
- Study Process and Framework.
- Study Framework: Goals and Objectives.
- Existing Economic Conditions.
- 2014/2040 Regional Travel Demand Model.
- 2014 VISSIM Traffic Demonstration.
- Schedule/Next Steps.

Study Process & Framework.

- Step 1: Goals and Objectives, Evaluation Criteria, and Public Involvement Plan.
- **Step 2: Existing Conditions.**
 - **Economic Conditions.**
- **Step 3: Future Conditions,** Alternatives Development, and Issues Evaluation.
 - **Projecting 2040 Traffic Volumes.**

Study Process & Framework.

- Step 4: Alternatives Analysis.
- Step 5: Recommendations.

Study Framework: Goals.

- To create/improve multimodal mobility in the Cape Cod Canal area.
- To establish an alternative or replacement crossing of the Cape Cod Canal to address the diminishing quality and reliability of year-round connectivity over the Cape Cod Canal, due to the aging Sagamore and Bourne Bridges.

Study Framework: Objectives.

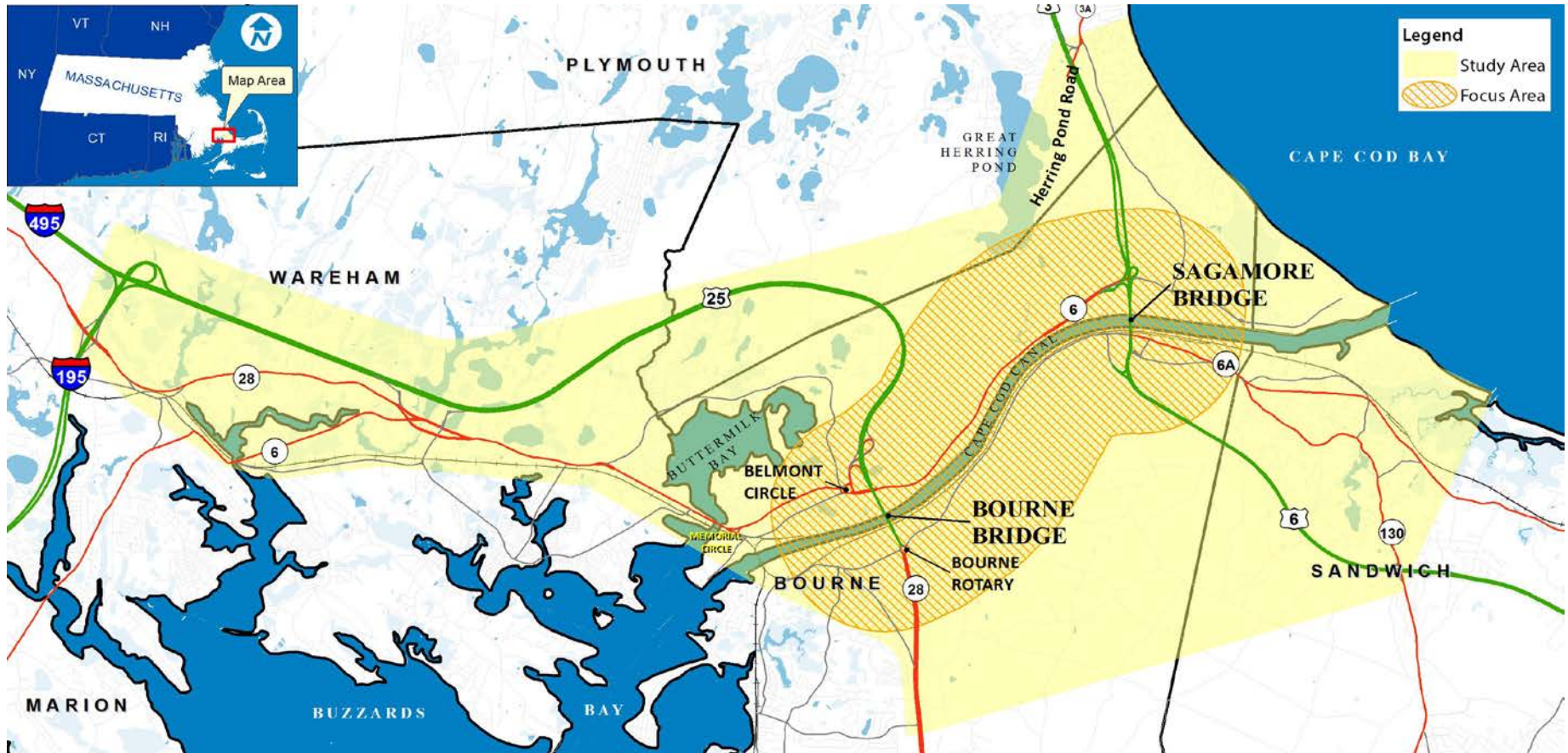
- Create reliable multimodal connectivity and mobility levels such that the quality of life on Cape Cod is not diminished by unreliable connectivity across the Cape Cod Canal.
- Create a reliable multimodal connection across the Cape Cod Canal to maintain/enhance public safety in the event of the need for an emergency evacuation of portions of Cape Cod and to accommodate first responders accessing Cape Cod.
- Ensure that cross canal connectivity does not become a barrier to reliable intra-community.

Economic Conditions and Trends

Frank Mahady

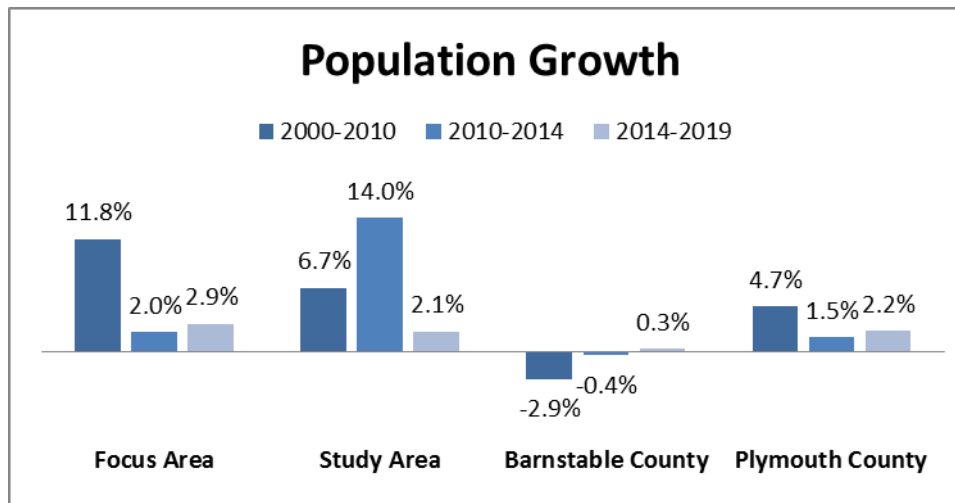
FXM Associates

Study Area.



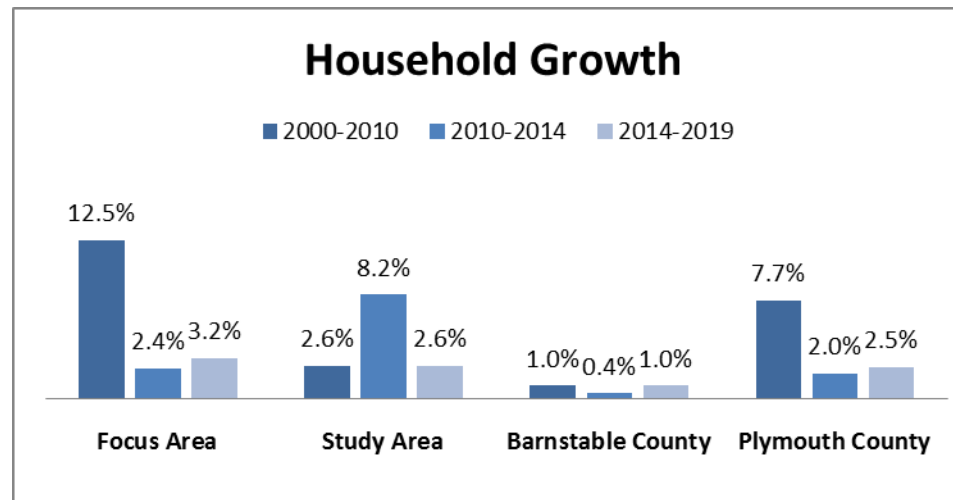
Both Focus and Study Areas show higher growth in population than Barnstable and Plymouth Counties overall.

Demographic Profile					
	Focus Area	%	Study Area	Barnstable County	Plymouth County
Population					
2000 Census	6,077		31,930	222,232	472,497
2010 Census	6,793		34,085	215,888	494,919
2014 Estimate	6,928		34,550	214,968	502,190
2019 Projection	7,128		35,286	215,713	513,012



Both Focus and Study Areas show higher growth in households than Barnstable and Plymouth Counties overall.

Demographic Profile				
	Focus Area	%	Study Area	Barnstable County Plymouth County
Households				
2000 Census	2,450		12,693	94,816 168,231
2010 Census	2,757		13,024	95,755 181,126
2014 Estimate	2,824		14,098	96,097 184,701
2019 Projection	2,915		14,470	97,018 189,318



Over 65 population *less* in Focus and Study areas compared to Barnstable County overall; median home values *significantly less* in overall Study area; median HH income *higher* in Plymouth County.

Demographic Profile								
	Focus Area	%	Study Area		Barnstable County		Plymouth County	
Age								
Median (years)	44.5		45.5		45.7		41.8	
Over 65	1,232	18%	6,739	20%	57,503	27%	7,954	16%
Under 18	1,378	20%	6,534	19%	34,963	16%	113,303	23%
Median HHLD Income	\$61,091		\$57,484		\$58,334		\$71,517	
Median Home Value	\$323,805		\$293,175		\$367,823		\$328,707	
Owner Occ. Avg.								
Length of Residence	17.9		18.0		19.4		20.2	
Source: The Nielsen Company <i>Site Reports</i> , 2014 data								

Well-educated workforce.

Workforce Profile

	Focus Area	%	Study Area		Barnstable County		Plymouth County	
Education								
Less than 9th grade	93	2%	491	2%	2,844	2%	10,377	3%
Some High School, no diploma	124	3%	1,080	4%	6,098	4%	17,287	5%
High School Graduate (or GED)	1,392	29%	8,257	34%	41,567	25%	103,013	30%
Some College, no degree	1,049	22%	4,939	20%	34,943	21%	64,641	19%
Associate Degree	513	11%	2,531	10%	15,296	9%	33,916	10%
Bachelor's Degree	1,092	23%	4,368	18%	37,407	23%	74,071	22%
Master's Degree	463	10%	2,127	9%	19,105	12%	30,836	9%
Professional School Degree	76	2%	370	2%	3,955	2%	5,991	2%
Doctorate Degree	28	1%	235	1%	3,130	2%	2,796	1%
<i>Less than High School Diploma</i>		5%		6%		5%		8%
<i>Bachelors Degree or Higher</i>		39%		36%		44%		41%

Occupational distribution similar between Barnstable and Plymouth Counties.

Workforce Profile

	Focus Area	%	Study Area		Barnstable County		Plymouth County	
Workers 16+ by Occupation Classification								
Blue Collar	652	20%	3,484	20%	19,622	19%	46,488	18%
White Collar	2,111	64%	10,248	60%	62,609	61%	162,799	64%
Service and Farm	552	17%	3,424	20%	20,706	20%	45,995	18%

Plymouth County residents have longest average travel time to work; all commute primarily alone by auto.

Workforce Profile

	Focus Area	%	Study Area		Barnstable County		Plymouth County	
Travel time to work (min.)	32		32		26		35	
Mode of transport to work								
Drove Alone	2,814	86.1%	14,359	85.2%	83,705	82.8%	200,299	80.6%
Car Pooled	137	4.2%	1,106	6.6%	6,323	6.3%	19,056	7.7%
Public Transportation	26	0.8%	184	1.1%	1,393	1.4%	12,265	4.9%
Walked	120	3.7%	458	2.7%	2,743	2.7%	4,604	1.9%
Bicycle	25	0.8%	42	0.3%	522	0.5%	307	0.1%
Other Means	35	1.1%	81	0.5%	851	0.8%	1,454	0.6%
Worked at Home	112	3.4%	632	3.8%	5,537	5.5%	10,673	4.3%

Distribution of employment similar to Counties overall, except for Focus Area sectors highlighted.

Business Profiles, Focus and Study Areas

NAICS	Business Type	Focus Area (FA)				Study Area (SA)			
		Employment	% of FA	Sales (\$ millions)	% of FA	Employment	% of SA	Sales (\$ millions)	% of SA
	TOTALS	5,229	100%	1,329	100%	22,640	100%	5,538	100%
11	Agriculture, Forestry, Fishing and Hunting	4	0.1%	0.5	0.04%	21	0%	3.8	0.1%
21	Mining, Quarrying, and Oil and Gas Extraction	7	0.1%	1.5	0.1%	7	0%	1.5	0%
22	Utilities	6	0.1%	0	0.0%	60	0%	24	0%
23	Construction	348	7%	115	9%	996	4%	300	5%
31-33	Manufacturing	137	3%	56	4%	993	4%	264	5%
42	Wholesale Trade	256	5%	522	39%	906	4%	2280	41%
44-45	Retail Trade	743	14%	228	17%	4,161	18%	1080	20%
48-49	Transportation and Warehousing	110	2%	9	1%	490	2%	57	1%
51	Information	113	2%	23	2%	231	1%	53	1%
52	Finance and Insurance	595	11%	161	12%	960	4%	223	4%
53	Real Estate and Rental and Leasing	181	3%	38	3%	546	2%	126	2%
54	Professional, Scientific, and Technical Svces	410	8%	78	6%	1,303	6%	211	4%
55	Management of Companies and Enterprises	0	0%	0	0%	0	0%	0	0%
56	Admin and Support and Waste Mgmt Svces	138	3%	18	1%	357	2%	46	0.8%
61	Educational Services	619	12%	1	0%	1,840	8%	3	0%
62	Healthcare and Social Assistance	434	8%	31	2%	4,694	21%	611	11%
71	Arts, Entertainment, and Recreation	197	4%	4	0%	570	3%	35	1%
72	Accommodation and Food Services	469	9%	30	2%	2,562	11%	164	3%
81	Other Services (except Public Administration)	227	4%	15	1%	913	4%	56	1%
92	Public Administration	235	4%	0	0%	1,030	5%	0	0%

Source: The Nielsen Company, Site Reports, 2014 data, and FXM Associates

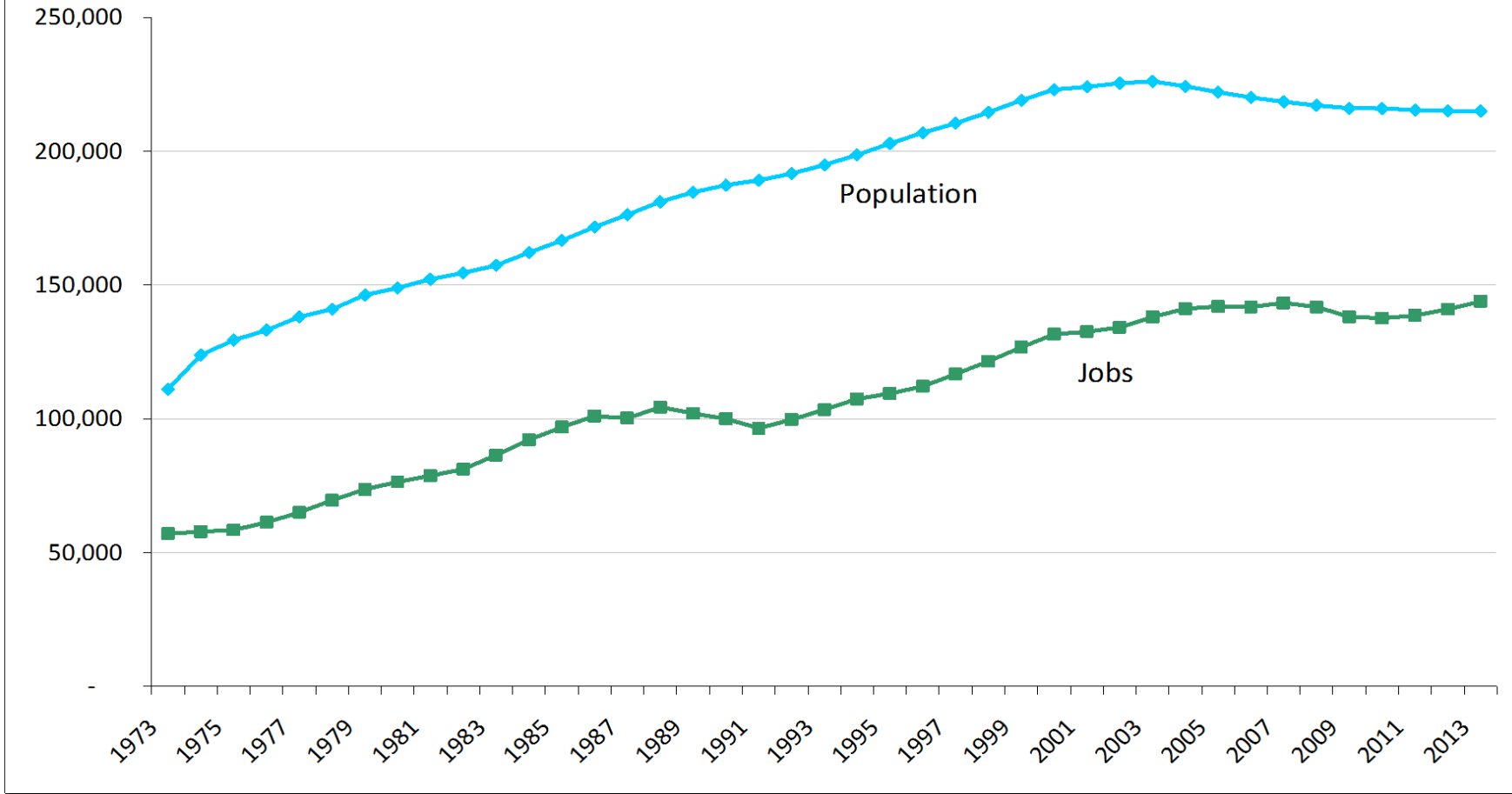
Distribution of employment *remarkably* similar between Counties, except for hotels/restaurants

Business Profiles, Barnstable and Plymouth Counties

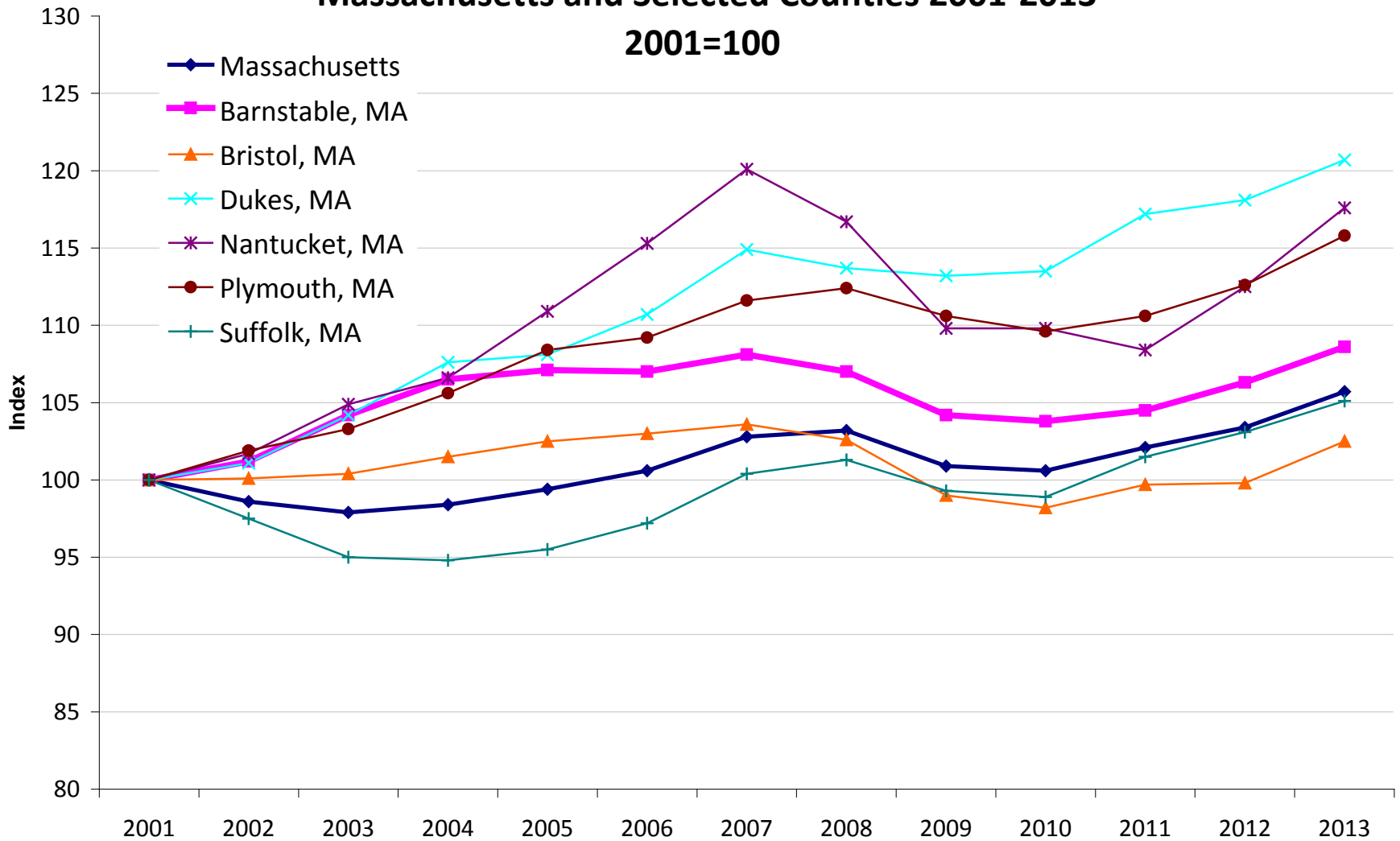
NAICS	Business Type	Barnstable County				Plymouth County			
		Employment	% of County	Sales (\$ millions)	% of County	Employment	% of County	Sales (\$ millions)	% of County
	Totals	137,100	100%	25,455	100%	223,586	100%	51,528	100%
11	Agriculture, Forestry, Fishing and Hunting	125	0.1%	24	0.1%	248	0%	43	0.1%
21	Mining, Quarrying, and Oil and Gas Extraction	107	0.1%	29	0.1%	29	0%	19	0.0%
22	Utilities	296	0.2%	119	0.5%	1,561	1%	1598	3%
23	Construction	8,776	6%	2767	11%	13,191	6%	4485	9%
31-33	Manufacturing	3,231	2%	1131	4%	14,199	6%	3148	6%
42	Wholesale Trade	4,083	3%	6199	24%	10,493	5%	18570	36%
44-45	Retail Trade	22,389	16%	5581	22%	36,023	16%	9092	18%
48-49	Transportation and Warehousing	5,643	4%	721	3%	5,168	2%	461	1%
51	Information	3,270	2%	820	3%	2,584	1%	653	1%
52	Finance and Insurance	3,645	3%	1006	4%	7,000	3%	2410	5%
53	Real Estate and Rental and Leasing	4,948	4%	1170	5%	6,477	3%	1566	3%
54	Professional, Scientific, and Technical Svces	6,445	5%	1164	5%	11,783	5%	2115	4%
55	Management of Companies and Enterprises	113	0%	11	0%	269	0%	60	0%
56	Admin and Support and Waste Mgmt Svces	4,709	3%	766	3%	8,482	4%	1102	2%
61	Educational Services	7,839	6%	25	0%	20,196	9%	50	0%
62	Healthcare and Social Assistance	18,808	14%	1873	7%	36,382	16%	3744	7%
71	Arts, Entertainment, and Recreation	5,196	4%	320	1%	5,344	2%	456	1%
72	<i>Accommodation and Food Services</i>	<i>20,756</i>	<i>15%</i>	<i>1402</i>	<i>6%</i>	19,185	9%	1217	2%
81	Other Services (except Public Administration)	7,962	6%	327	1%	13,565	6%	741	1%
92	Public Administration	8,759	6%	0	0%	11,407	5%	0	0%

Source: The Nielsen Company, Site Reports, 2014 data, and FXM Associates

Total Population and Jobs in Barnstable County 1973-2013



Index of Total Employment Massachusetts and Selected Counties 2001-2013 2001=100



Average wages in Barnstable and Plymouth Counties favorable for additional employment growth.

Income and Wages, State of Massachusetts and Counties				
	State of Massachusetts	Suffolk County	Plymouth County	Barnstable County
Per capita personal income	\$57,248	\$57,660	\$55,935	\$62,187
Avg annual wages & salaries	\$60,307	\$79,697	\$46,422	\$41,733
Source: U.S. Bureau of Economic Analysis, 2013				

Several industries grew faster in Barnstable County than in the State overall as well as selected Counties.

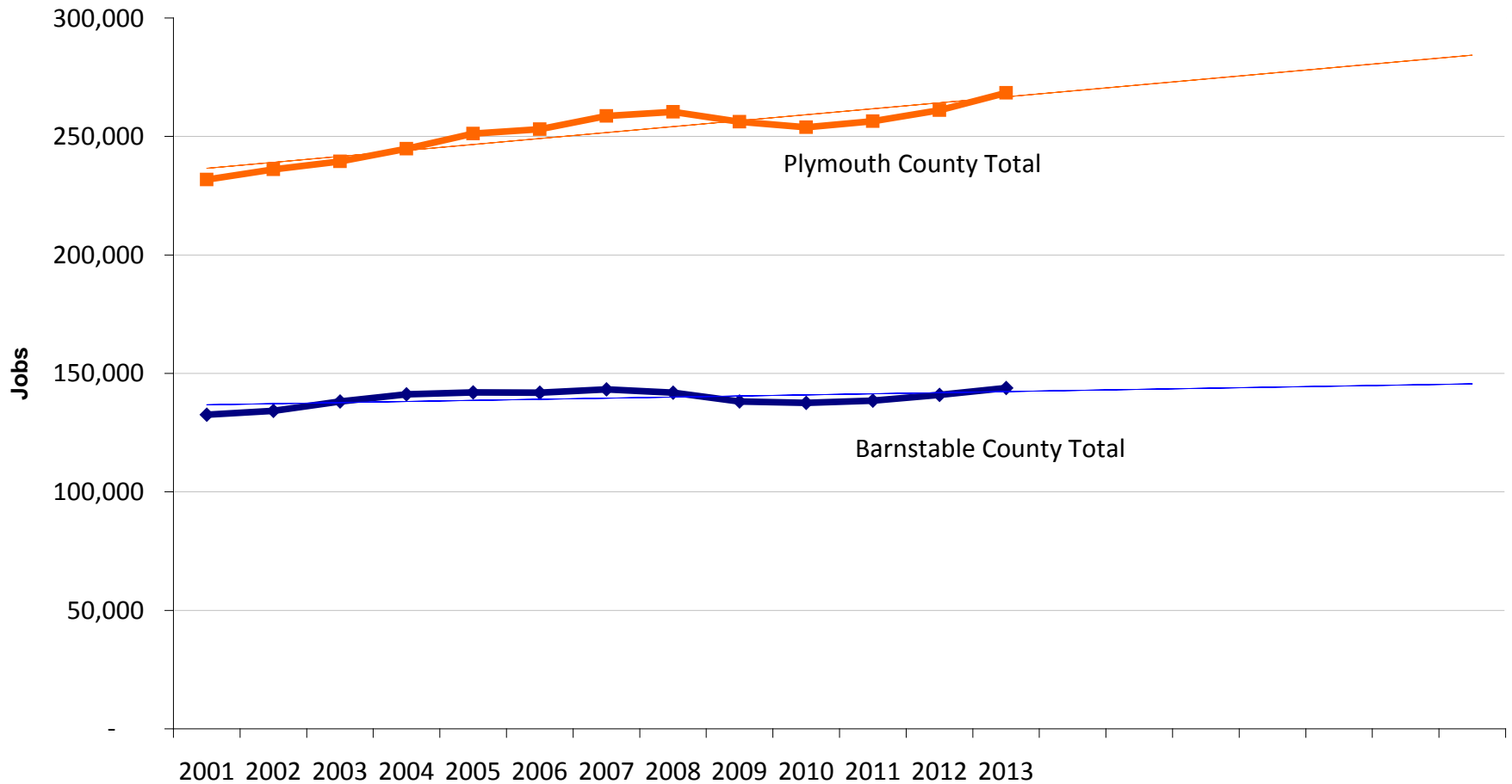
Compound Annual Growth Rates (%) for Selected Industries, Counties and State Where the Rate in Barnstable County Exceeded the Average for Massachusetts Overall 2001-2013

	Barnstable County	Plymouth County	Bristol County	Suffolk County	State of Mass
Employment by place of work (number of jobs)					
Total employment	0.70	1.20	0.20	0.40	0.5
Construction	0.10	0.40	0.10	-1.40	-0.3
Wholesale trade	1.00	-0.50	0.00	-1.50	-1
Finance and insurance	2.00	4.10	2.50	-0.50	1.3
Administrative and waste management services	2.10	1.80	1.20	-1.10	0.5
Educational services	3.70	3.30	2.60	1.90	1.5
State government	0.50	2.20	2.60	-1.50	0.2
Local government	0.70	0.60	-0.30	-1.30	0.2

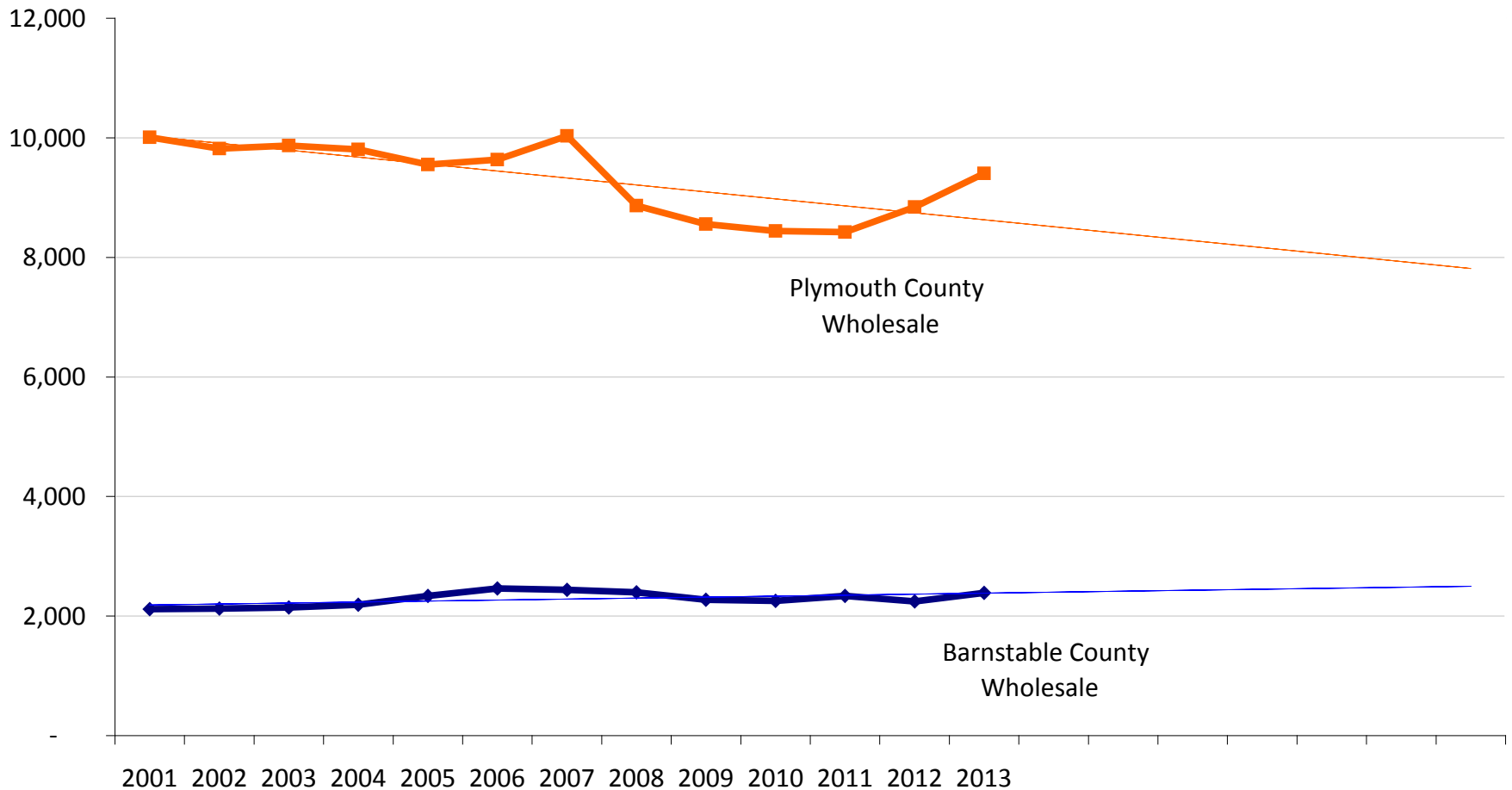
Source: U.S.D.O.C, Bureau of Economic Analysis, Regional Economic Information System; and FXM Associates

The following slides show historical and projected growth in jobs for industries in Barnstable County that grew between 2001 and 2013 and are projected to continue growing at least through 2020 based on the recent 12-year trend. The historical and projected growth in these industries is also shown for Plymouth County .

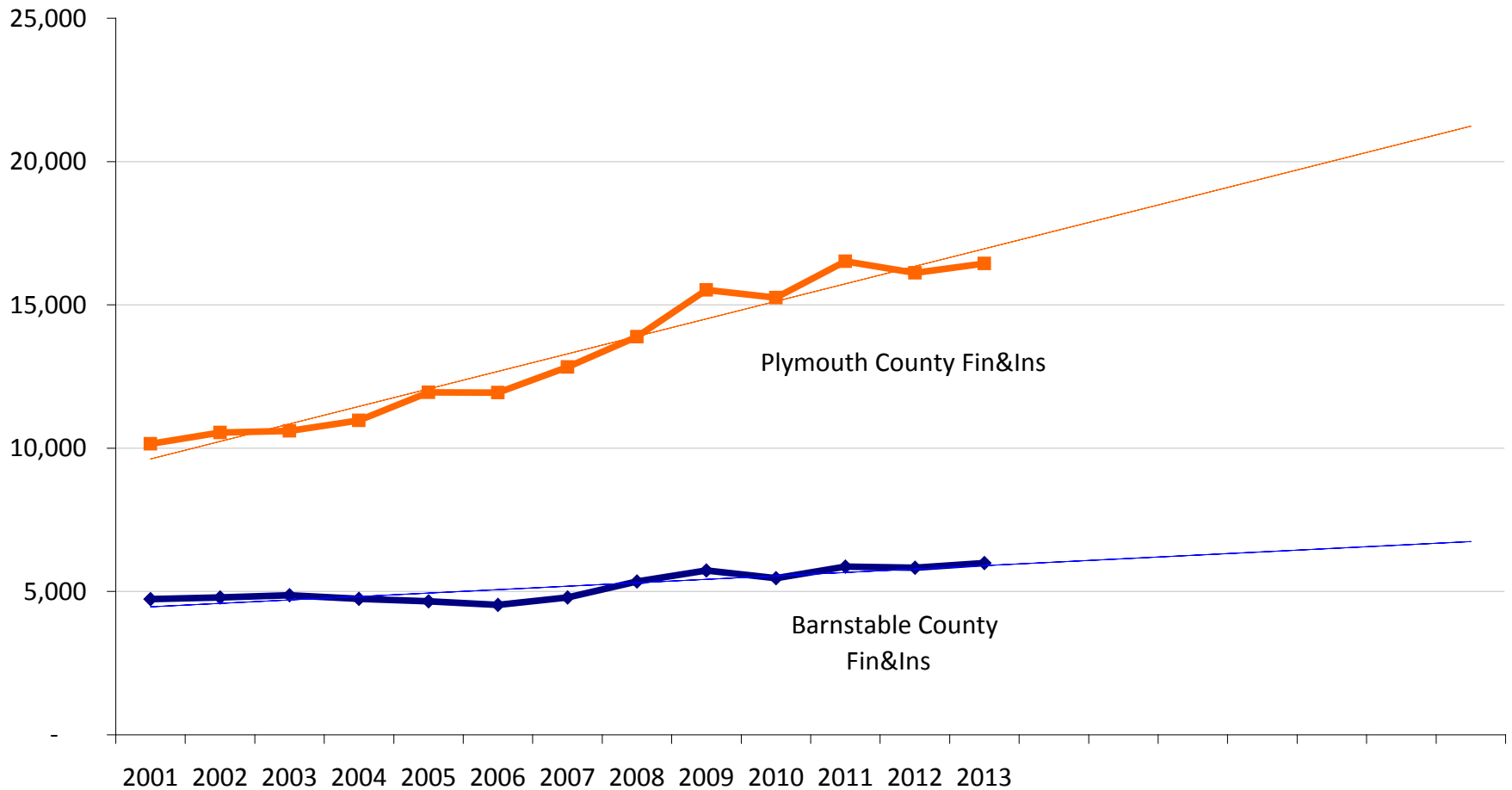
Historical and Projected *Total* Employment Barnstable and Plymouth Counties 2001-2020



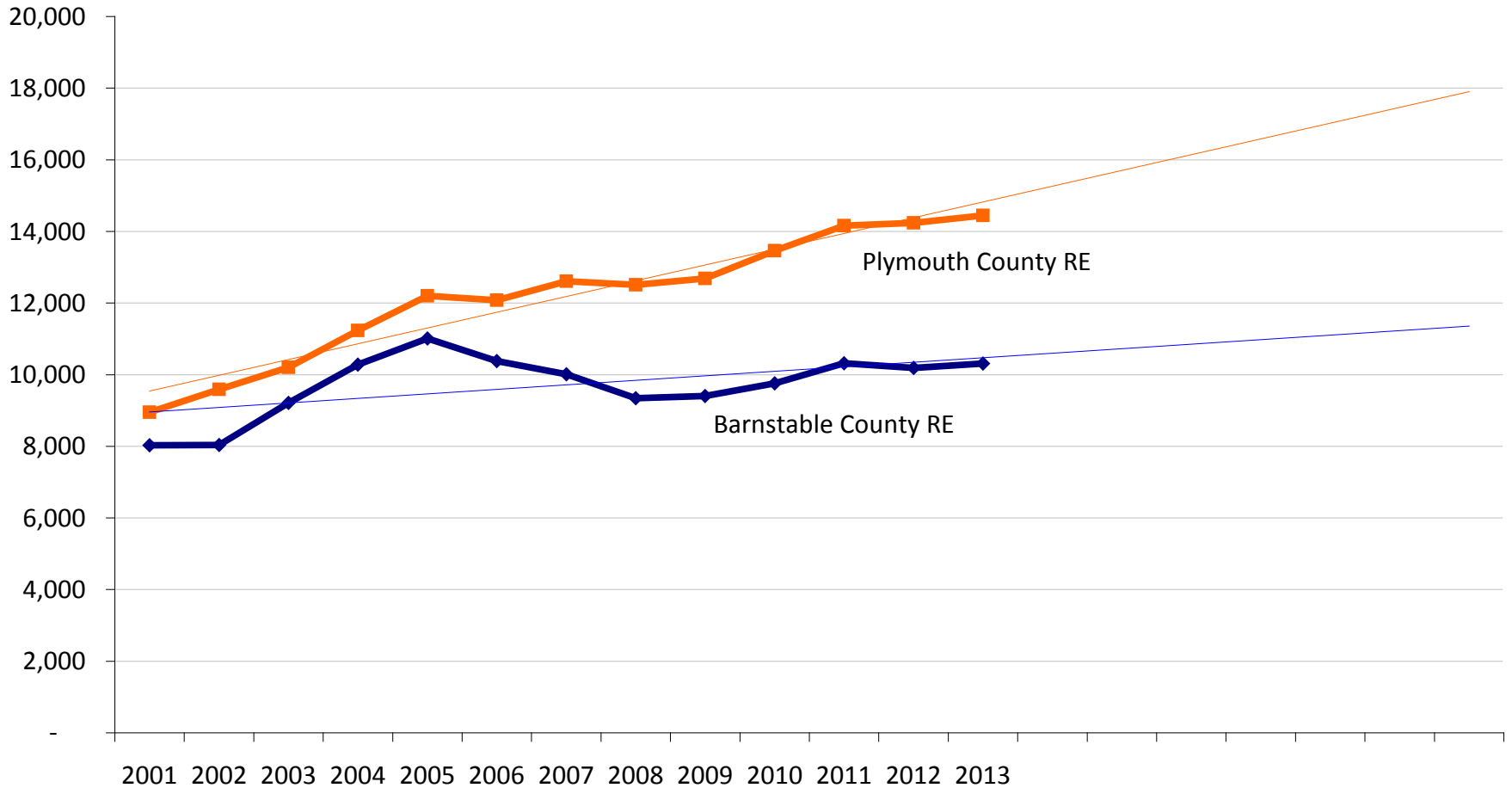
Historical and Projected *Wholesale* Employment Barnstable and Plymouth Counties 2001-2020



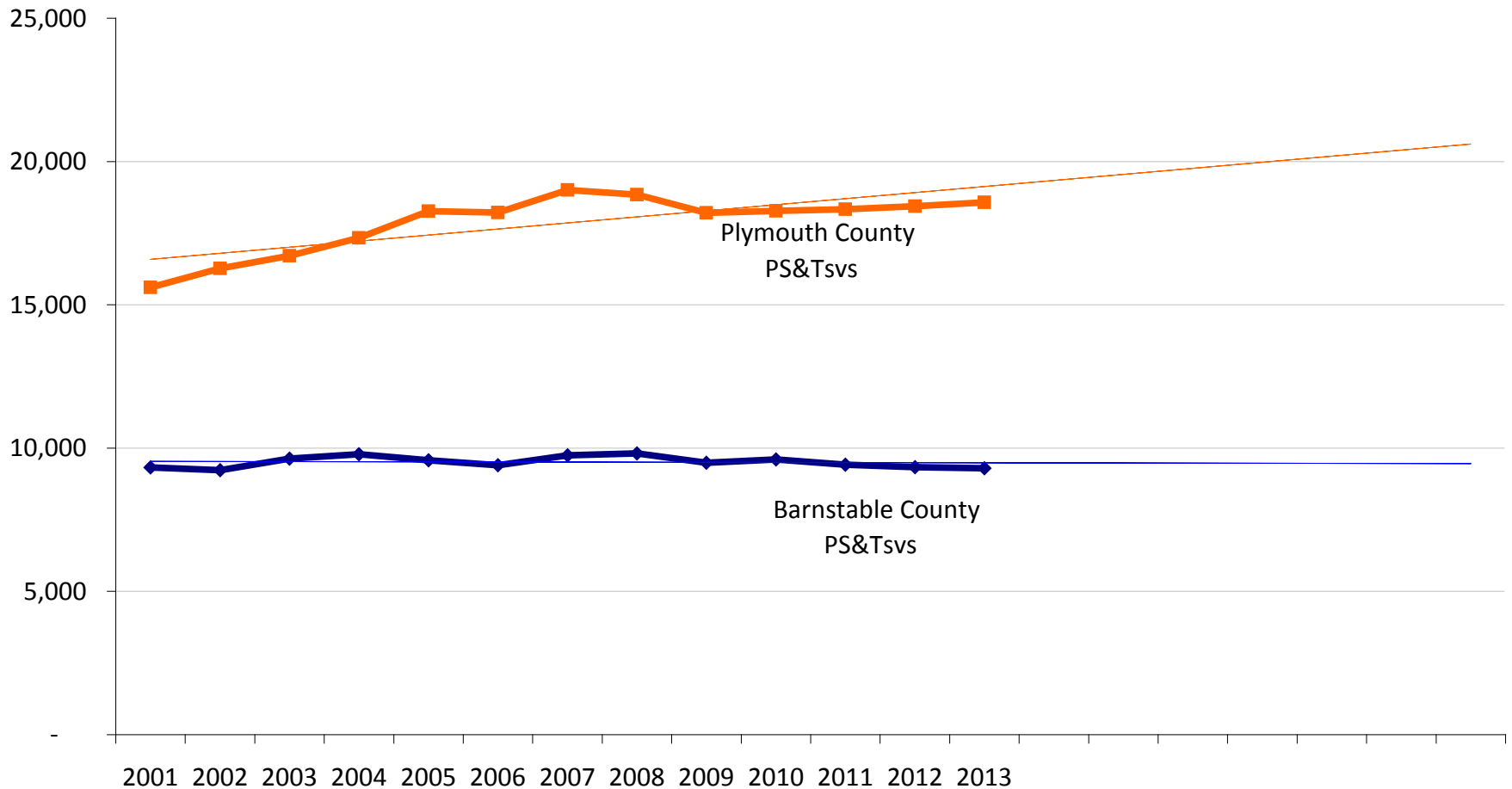
Historical and Projected Employment in *Finance & Insurance* Barnstable and Plymouth Counties 2001-2020



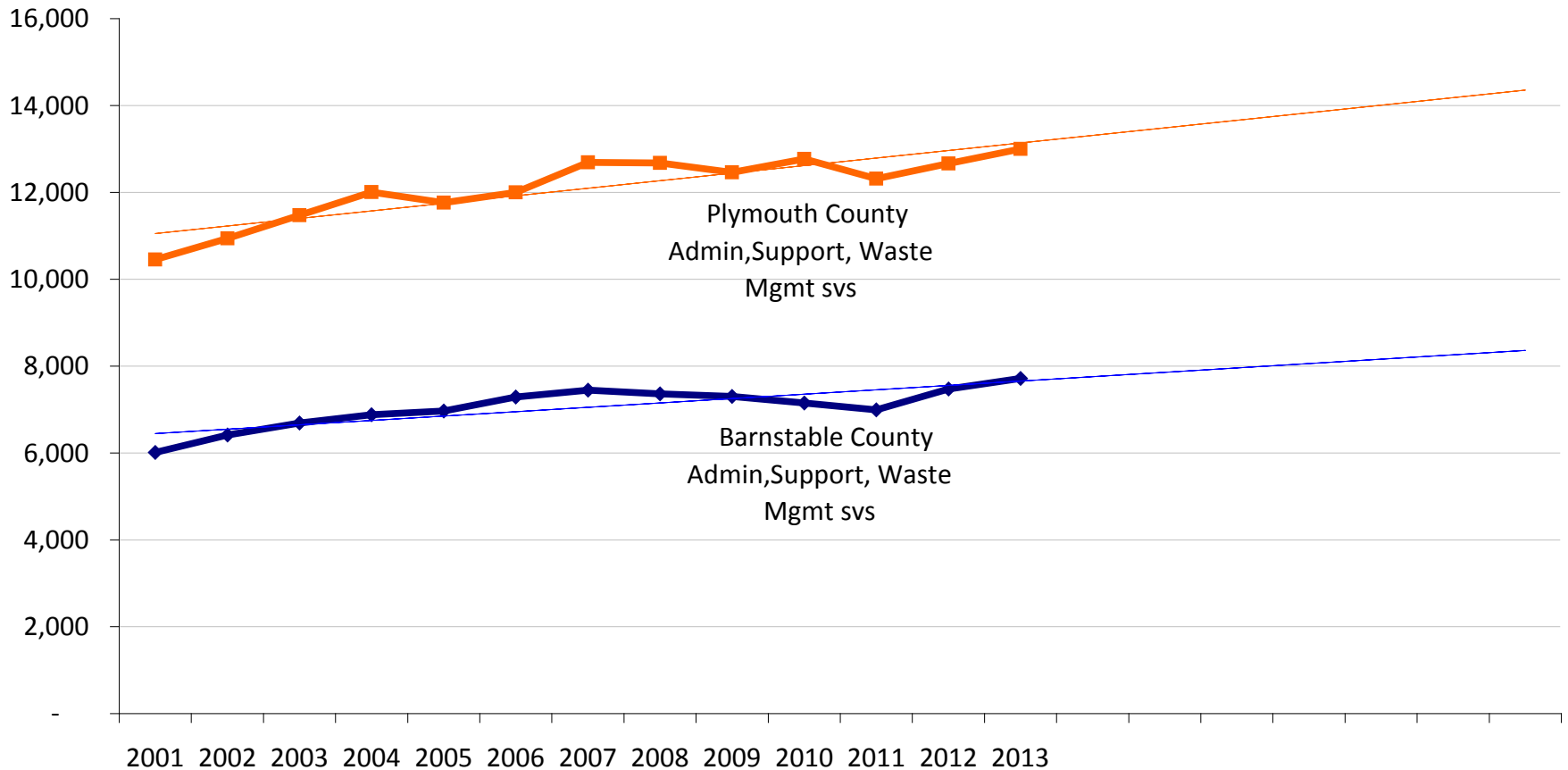
Historical and Projected Employment in *Real Estate Rental & Leasing* Barnstable and Plymouth Counties 2001-2020



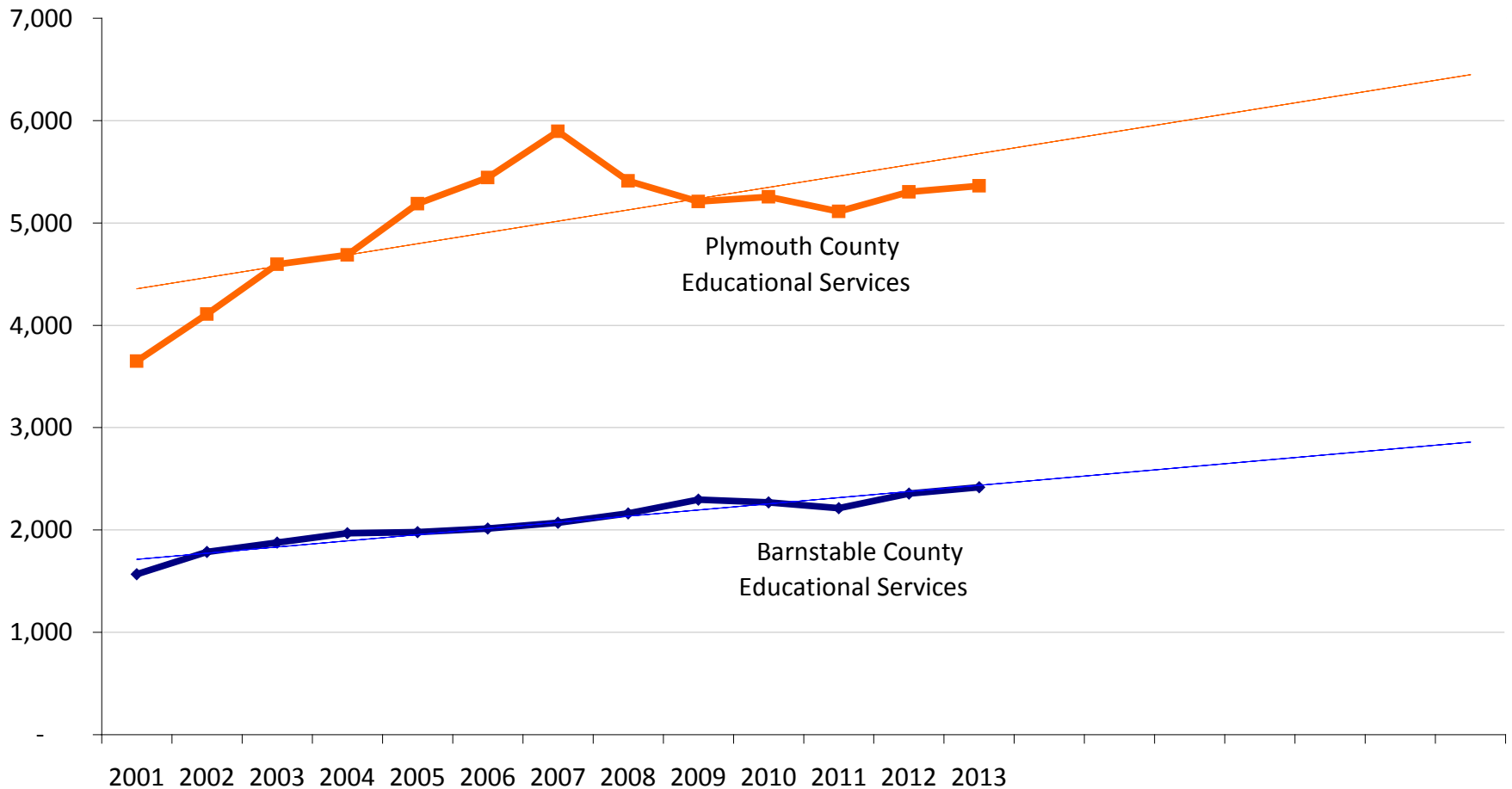
Historical and Projected Employment in *Professional, Scientific & Technical Services* in Barnstable and Plymouth Counties 2001-2020



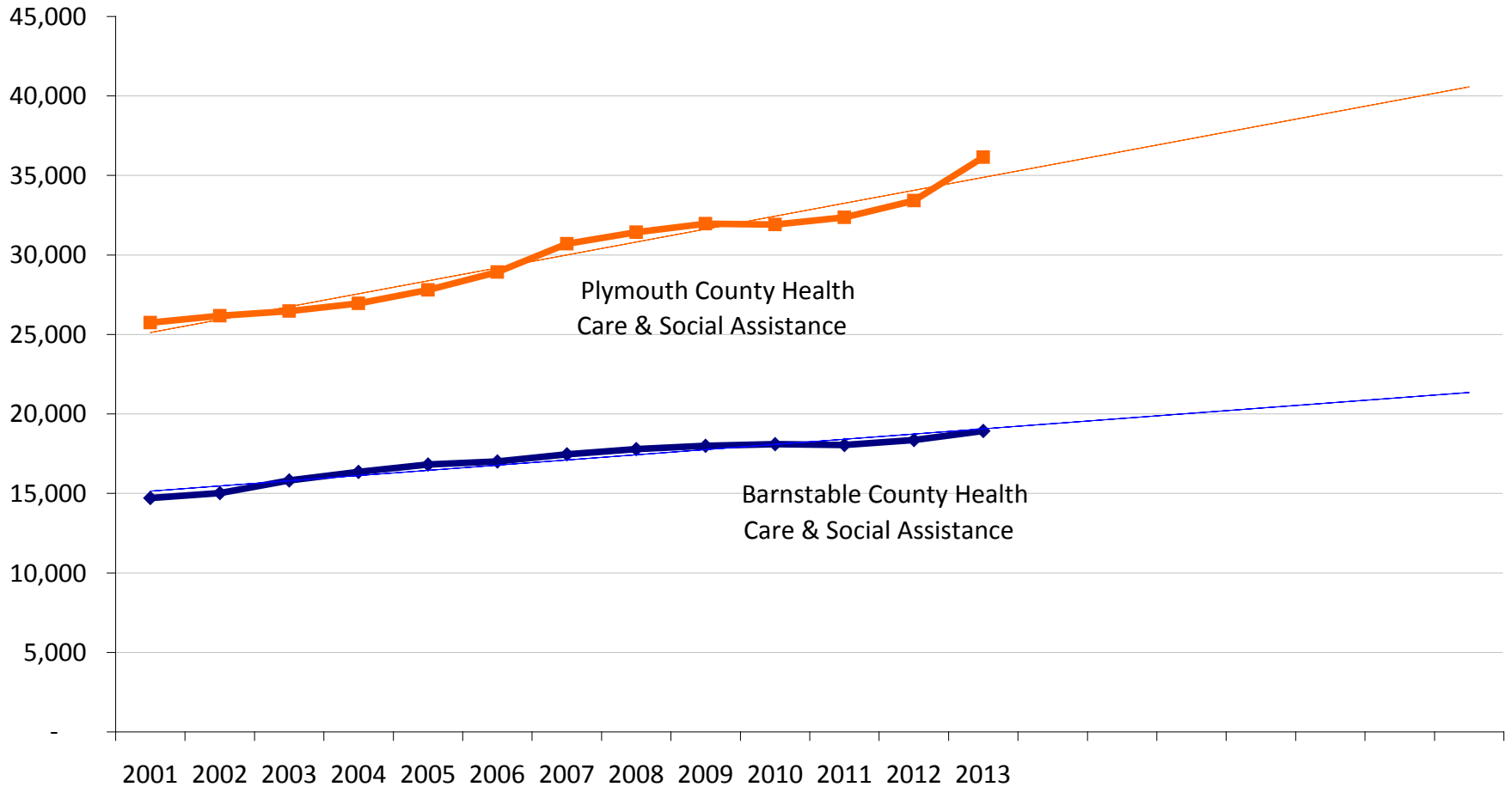
**Historical and Projected Employment in *Administrative, Support, Waste Management & Remedial Services*
Barnstable and Plymouth Counties
2001-2020**



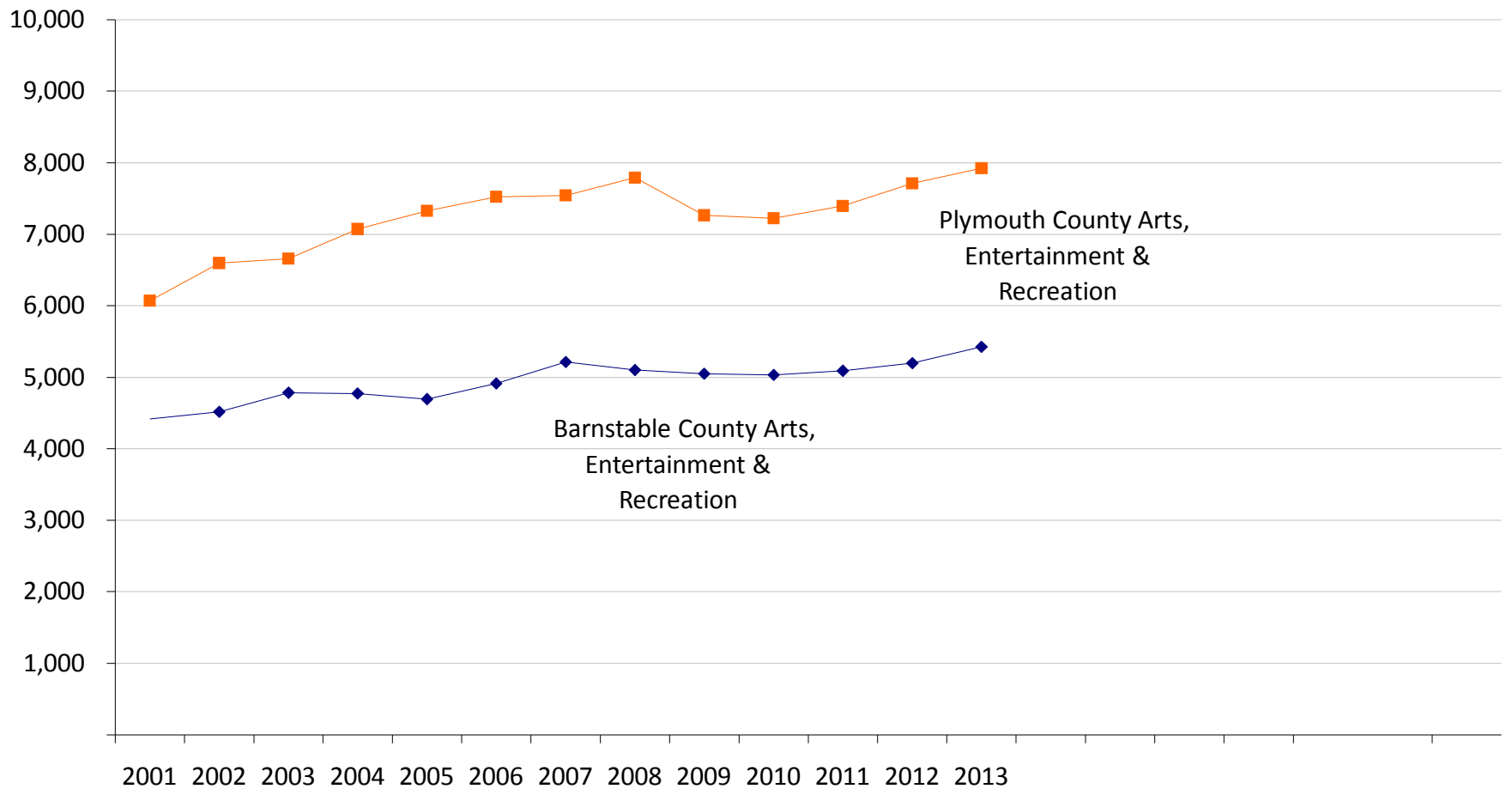
Historical and Projected Employment in *Educational Services* Barnstable and Plymouth Counties 2001-2020



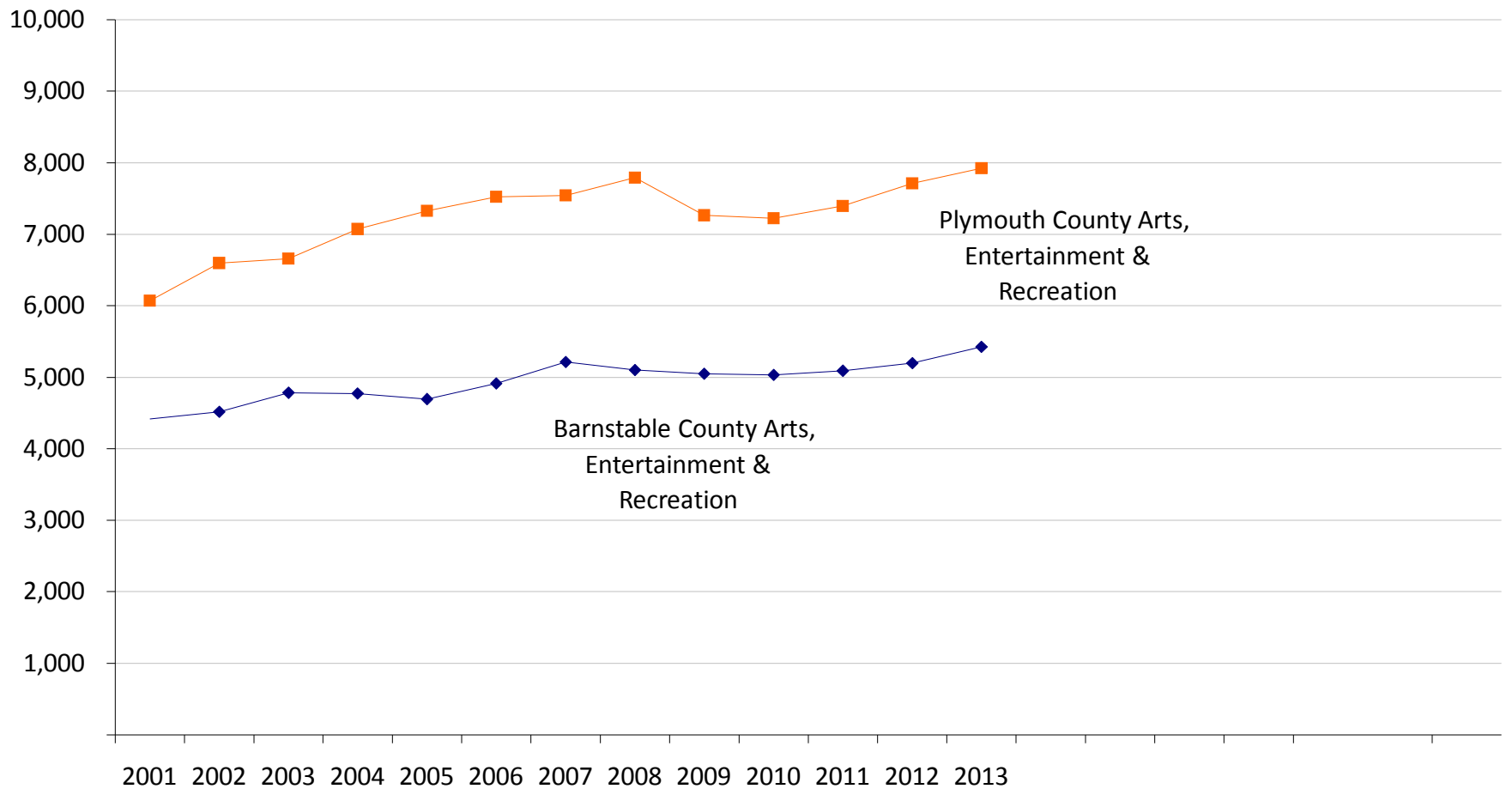
Historical and Projected Employment in *Health Care & Social Assistance* Barnstable and Plymouth Counties 2001-2020



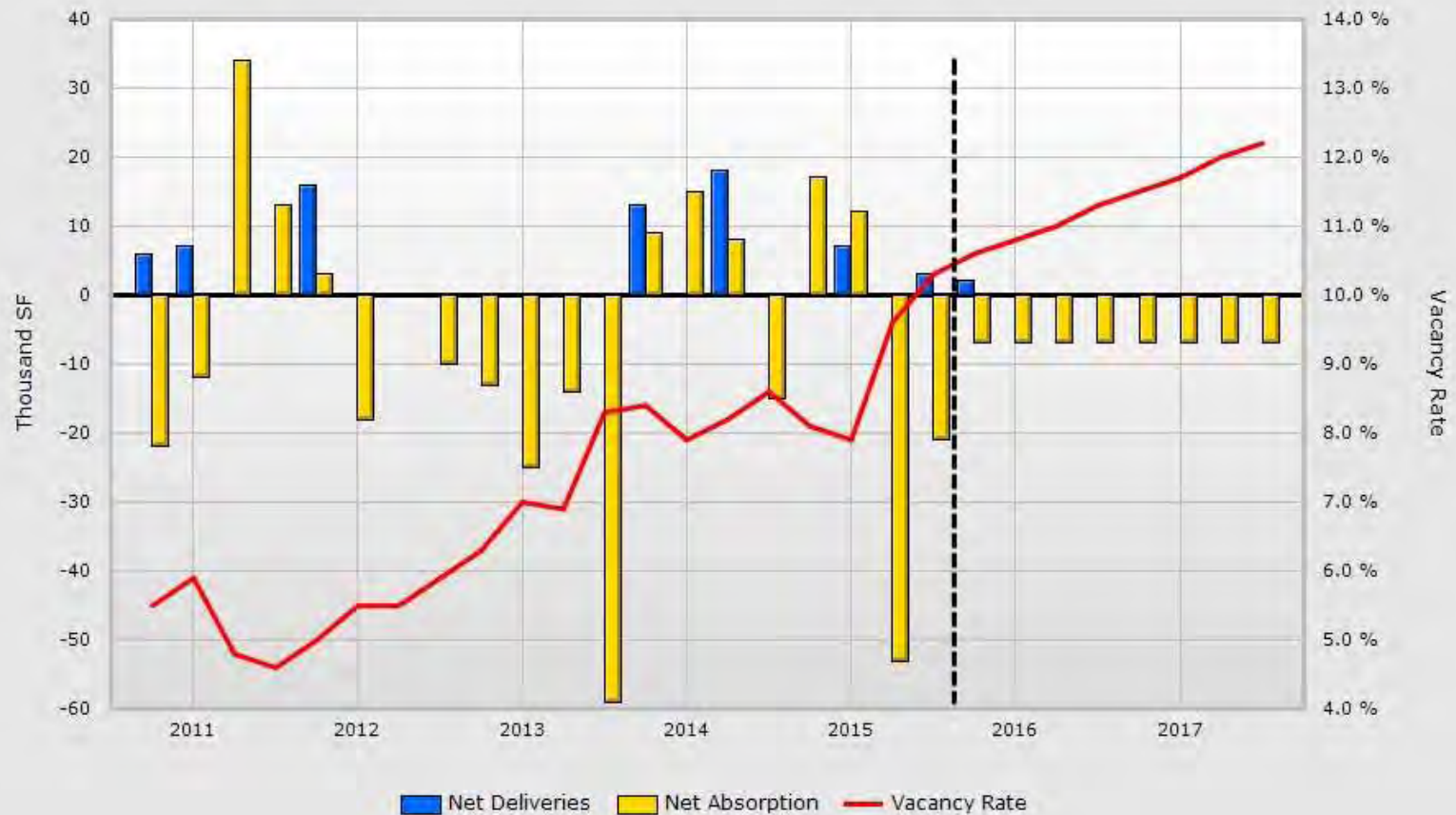
Historical and Projected Employment in *Arts, Entertainment & Recreation* Barnstable and Plymouth Counties 2001-2020



Historical and Projected Employment in *Arts, Entertainment & Recreation* Barnstable and Plymouth Counties 2001-2020



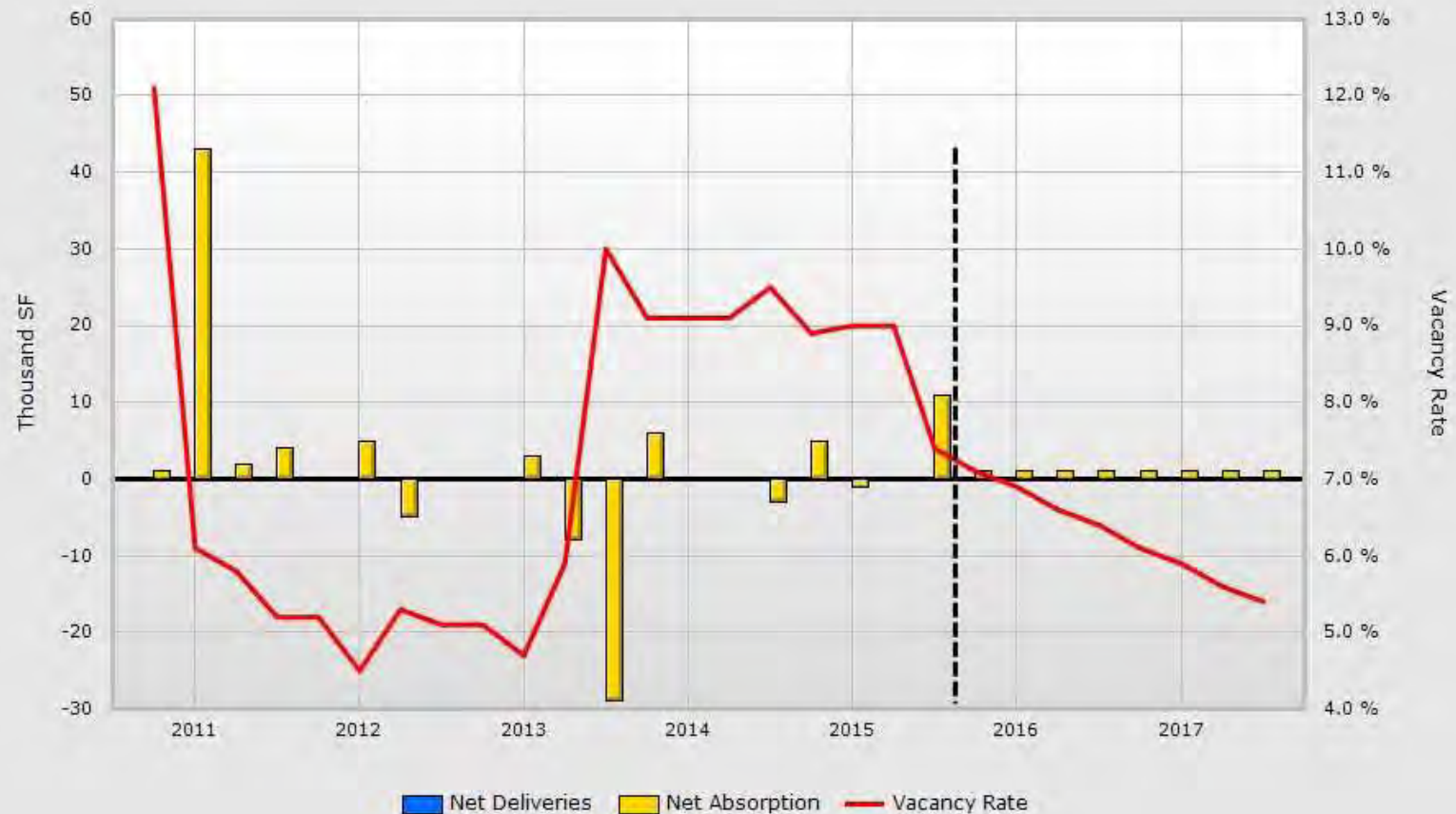
Historical and forecast net absorption, new deliveries, and vacancy rates Barnstable County OFFICE space



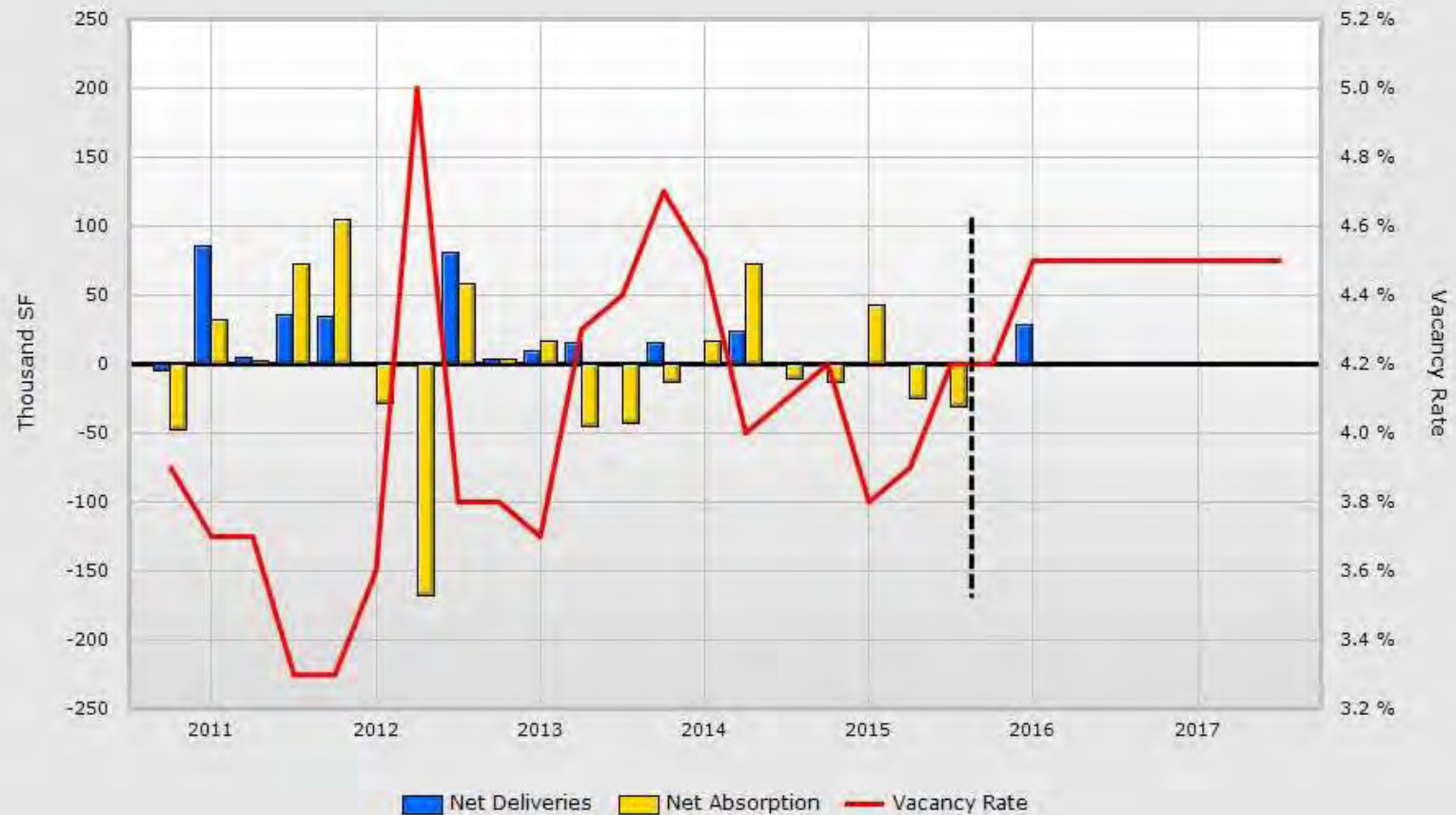
Historical and forecast net absorption, new deliveries, and vacancy rates Barnstable County INDUSTRIAL space



Historical and forecast net absorption, new deliveries, and vacancy rates Barnstable County FLEX space



Historical and forecast net absorption, new deliveries, and vacancy rates Barnstable County RETAIL space



- Long term historical growth rate in population and jobs (1970s,80s,90s) not sustainable
- However, some industries have shown recent growth compared to overall economy and additional jobs and development possible
- Intense competition among regions and communities statewide for limited projected economic growth

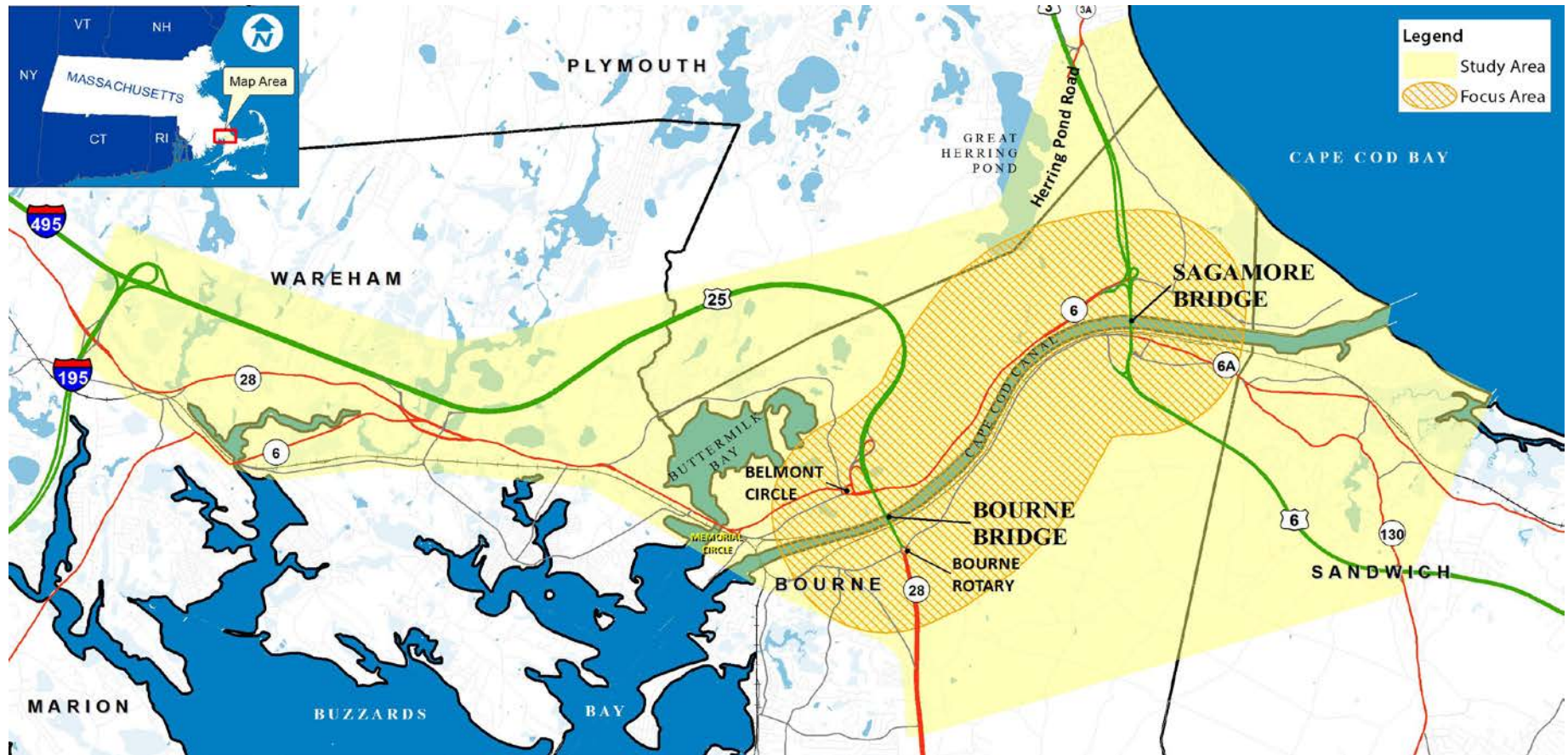
Questions?

Comments and feedback can be emailed to
Ethan Britland - ethan.britland@state.ma.us



Regional Travel Demand Model.

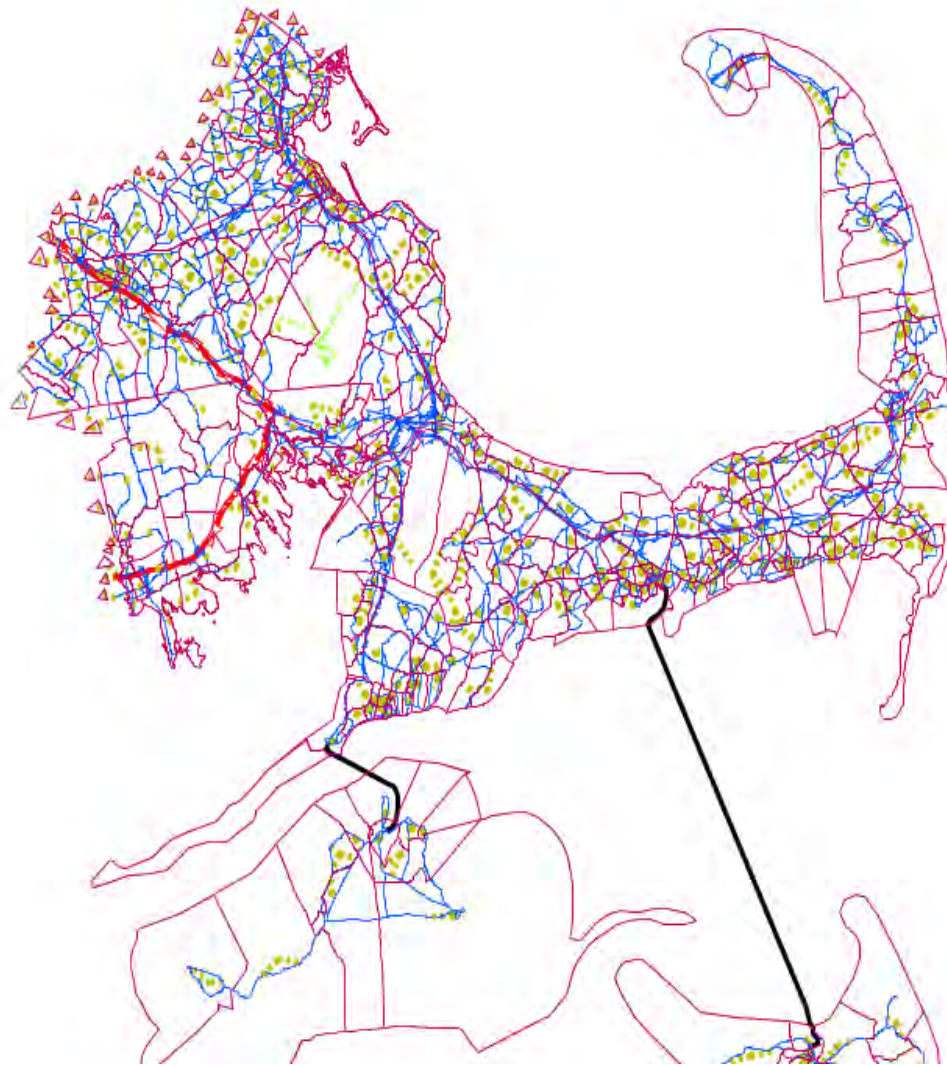
Study Area.



Regional Travel Demand Model.

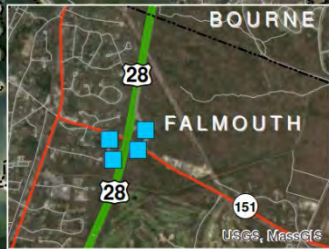
- Includes roadway network for entire Cape Cod and portions of mainland.
- Includes data on population and journey to work.

Travel Demand Model Area.



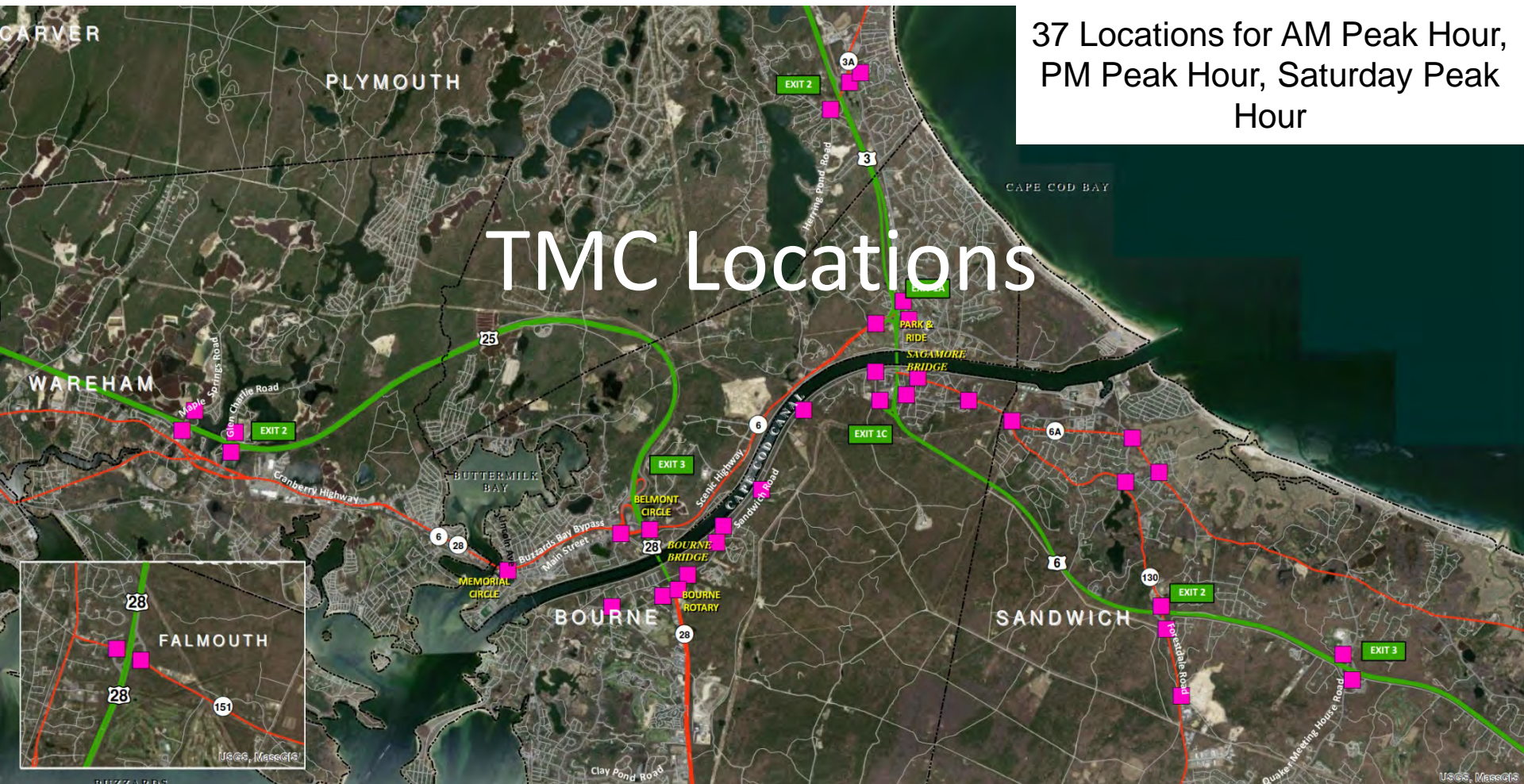
57 Seven-day ATR Counts
for Summer and Non-
Summer 2014

ATR Locations



Legend

- Town Boundary
- Map Enlargement Areas
- ATR Locations



Model Calibration.

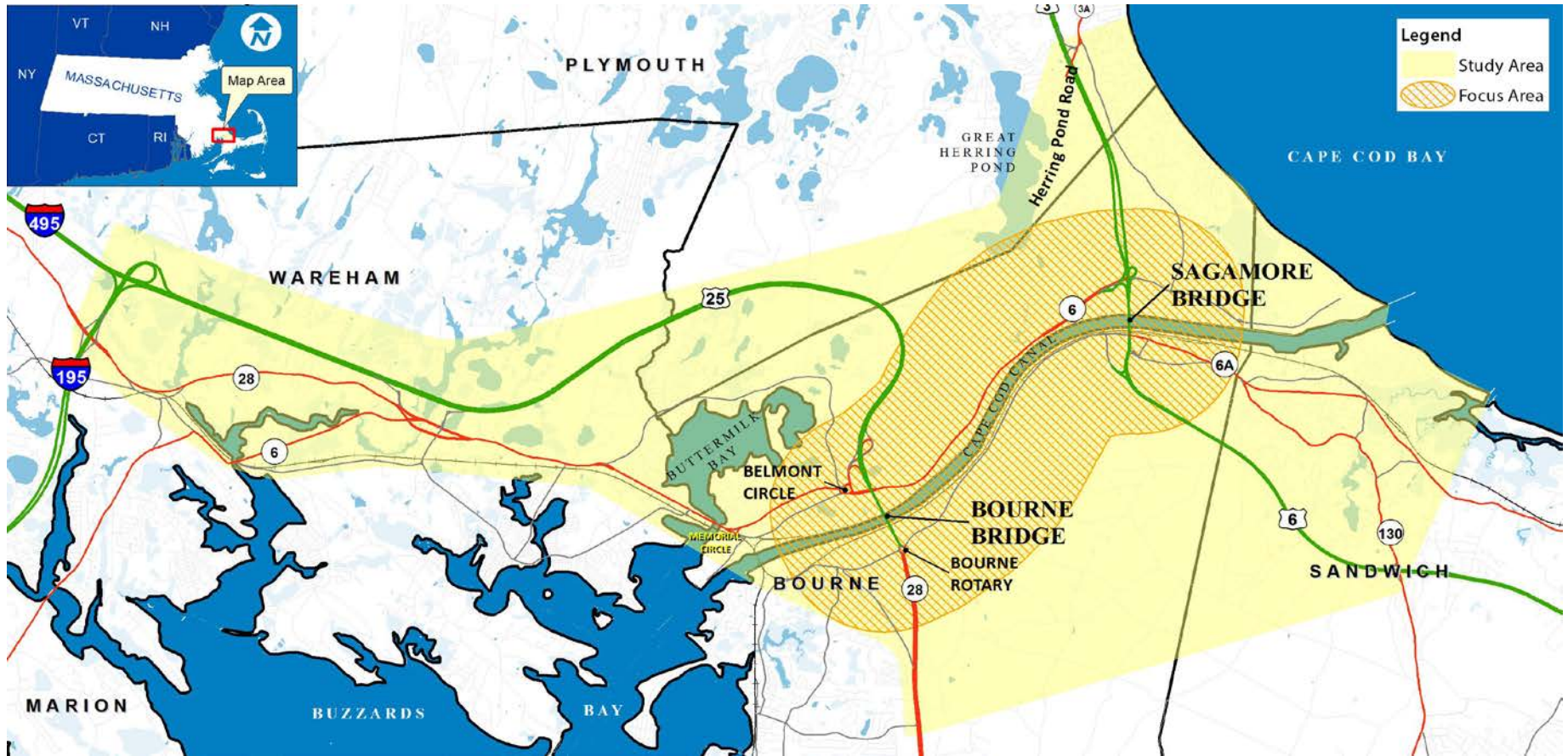
Reconciling model generated
trips with counted traffic
volumes.

Questions?

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Study Area.



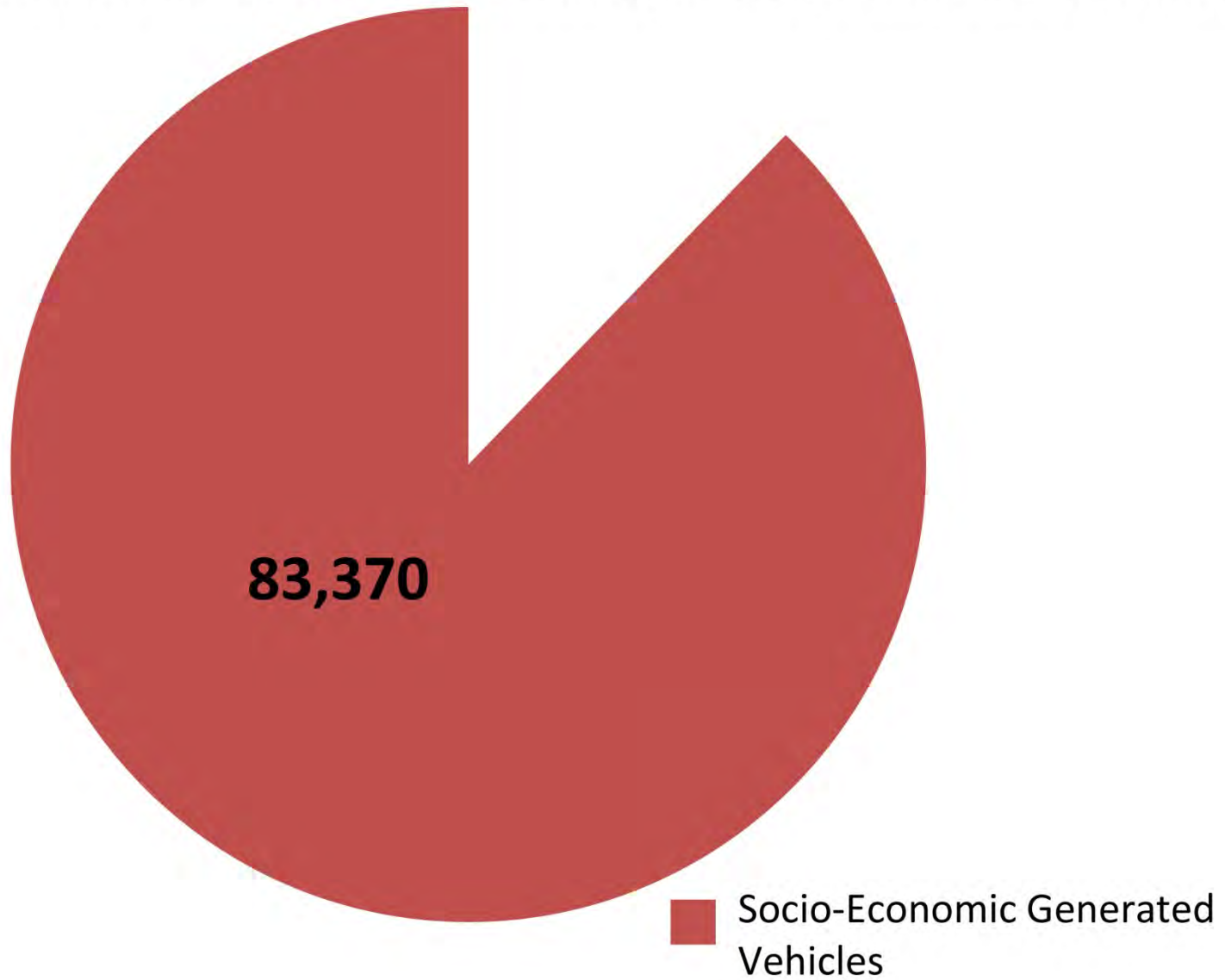
Projecting 2040 Traffic Volumes.

Model Generated Trips Based on socio-economic data .

- Work trips on/off Cape.
- School trips on/off Cape.
- Shopping trips, deliveries, etc.

**2014 Fall Weekday Vehicles Crossing the
Canal are 94,950**

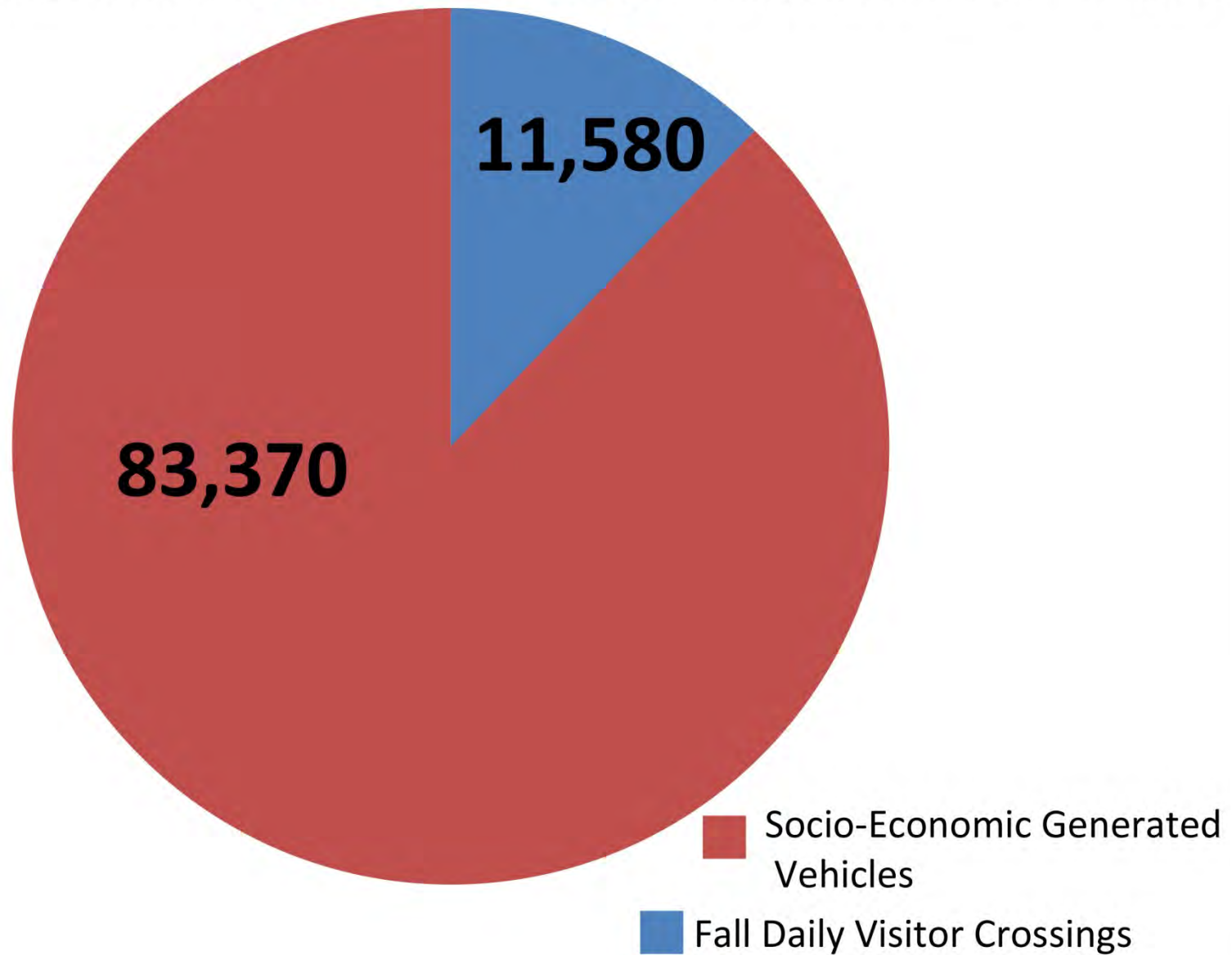
2014 Fall Weekday Vehicles Crossing the Cape Cod Canal = 94,950



Model Generated Trips.

- Work trips on/off Cape.
- School trips on/off Cape.
- Shopping trips, deliveries, etc.
- DOES NOT generate visitor trips.

2014 Fall Weekday Vehicles Crossing the Cape Cod Canal = 94,950



Two Components of 2040 Trip Generation.

Regional Travel Demand Model.

Future trips generated by area residents through work commuting, school, and other daily activities (based on projected 2040 socio-economic data supplied by CTPS)

Visitation

Projecting future visitation requires different information.

Economic Model to Assist Forecasting Visitations to Cape Cod.

Frank Mahady.

FXM Associates.

Objectives.

Assist travel demand forecasting.

Focus on peak season and overall visitor socioeconomic indicators as distinct from year-round population and jobs.

Use economic data to estimate future growth in tourism.

Sources and Methods.

No direct counts of visitors available.

Indirect or proxy measures needed for analysis.

Trends in employment in hotels and restaurants used as a proxy for trends in visitor activity.

Sources and Methods (cont).

The forecast growth rate for visitors to Cape Cod is determined through analysis of trends in hotel and restaurant employment and other economic indicators to construct a 'multiple regression model'.

Other 'economic indicators' include:

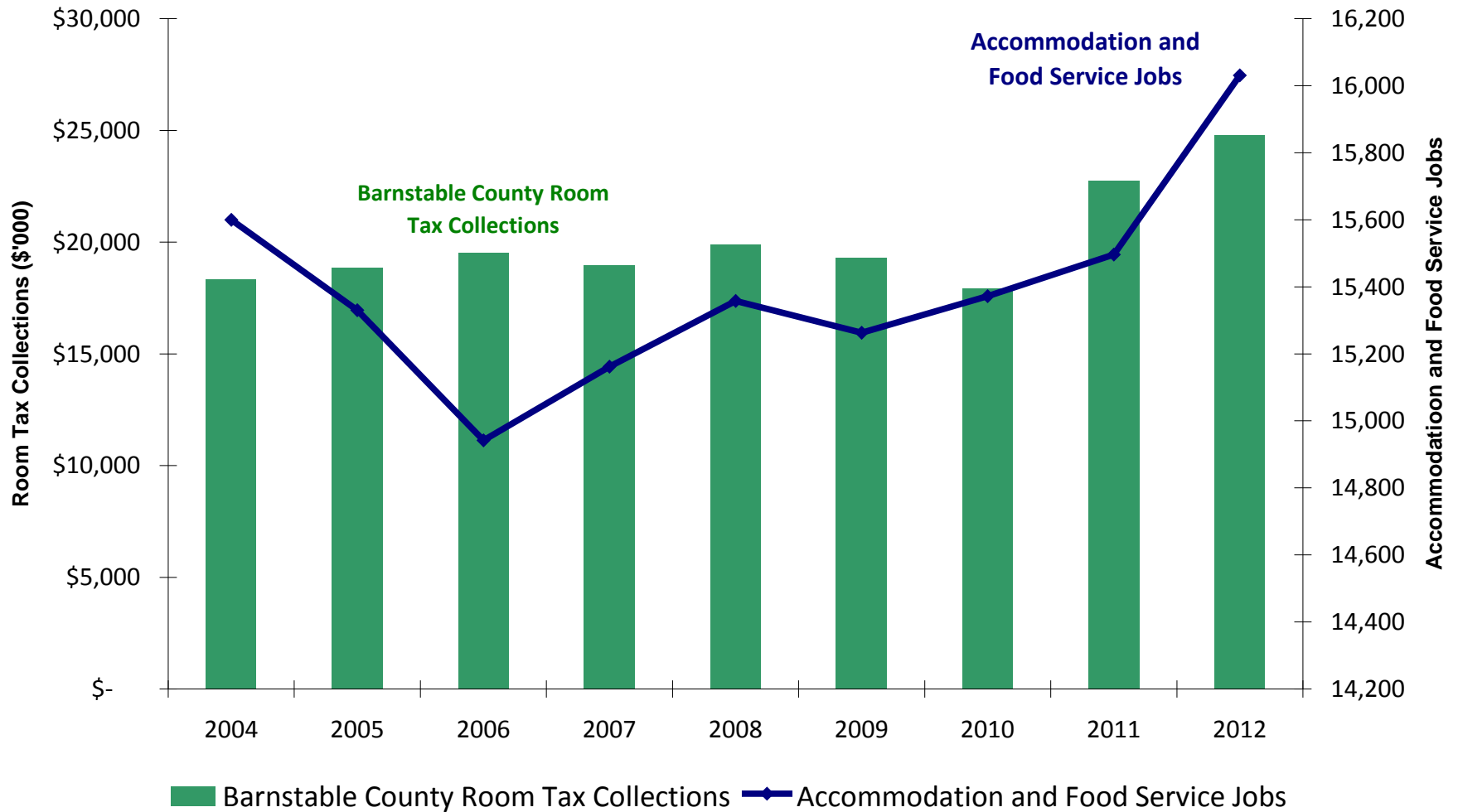
- peak season bridge crossings;

- Statewide/County population/employment;

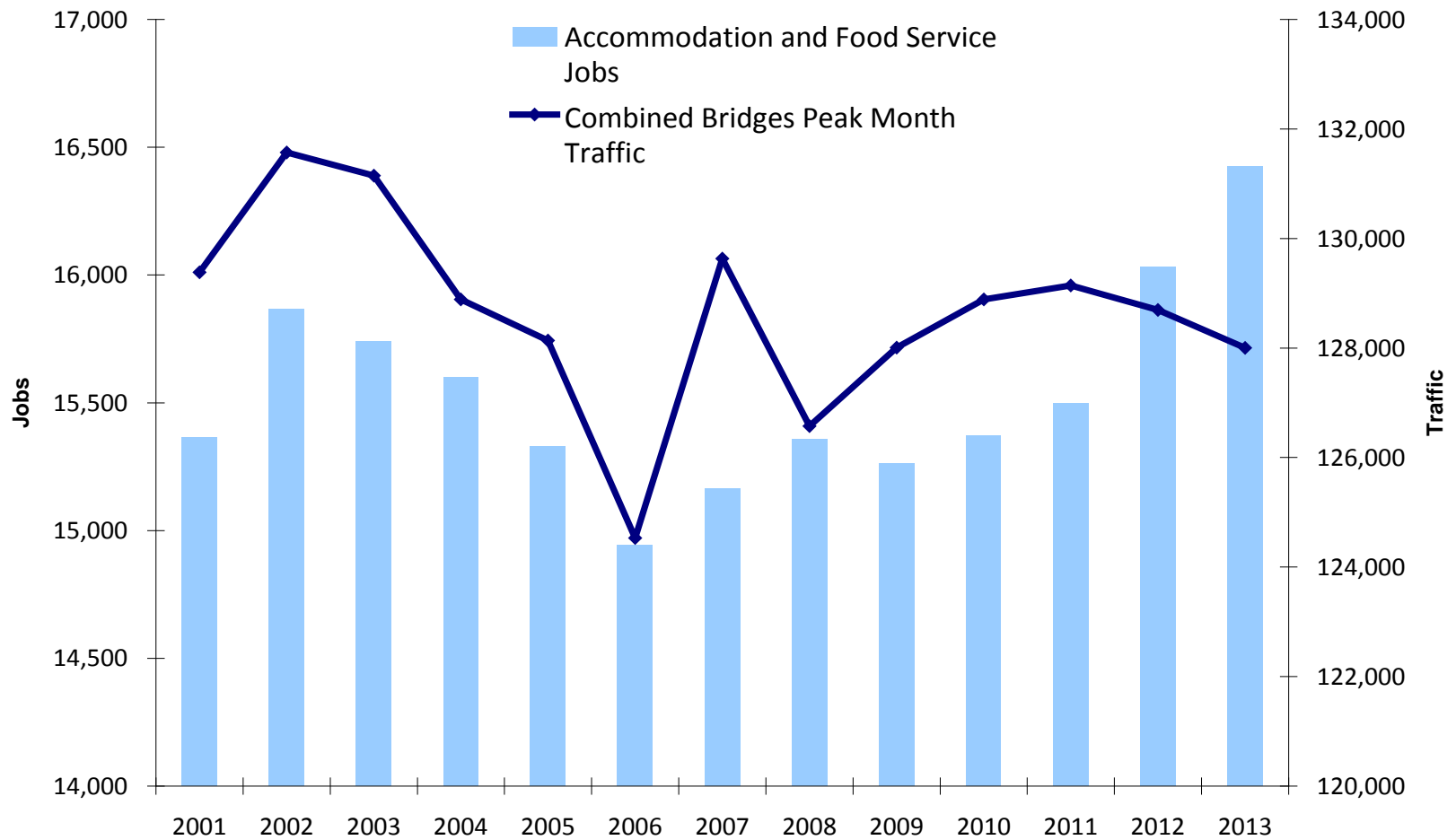
- Barnstable County population/employment; and

- Hotel room tax revenues.

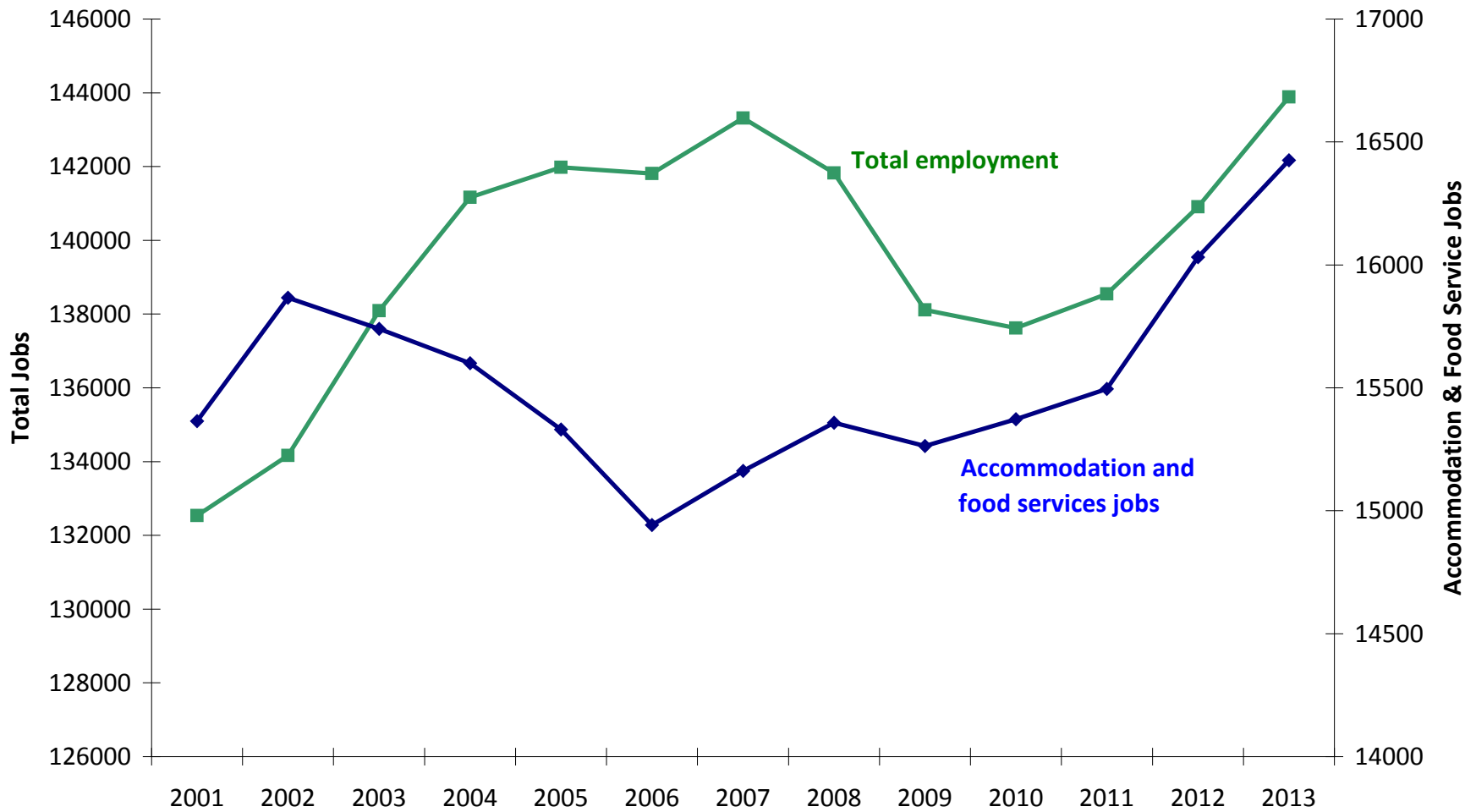
Barnstable County Room Tax Collections and Accommodation and Food Service Jobs



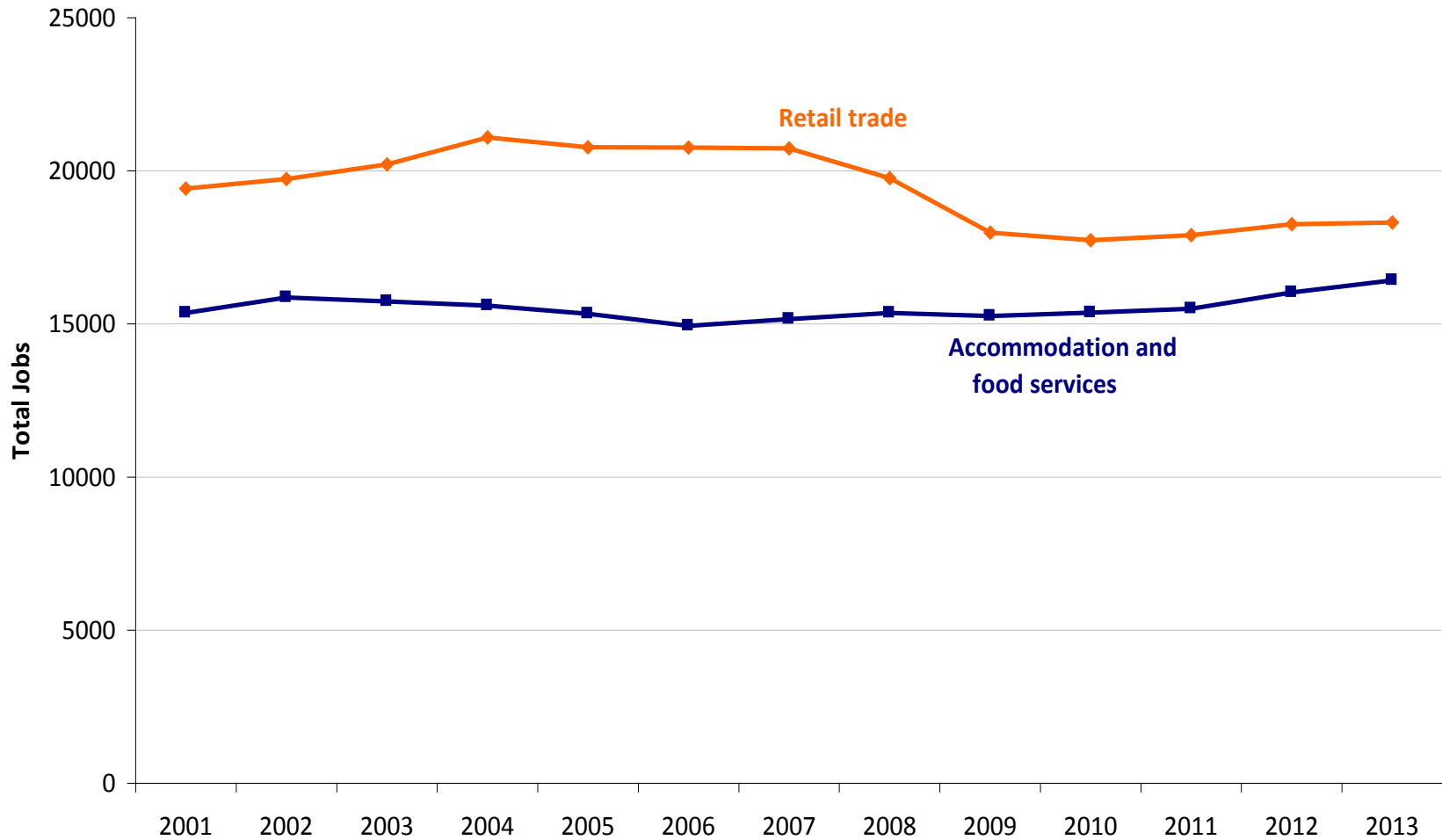
Peak Month Bridges Traffic and Hotel/Restaurant Jobs



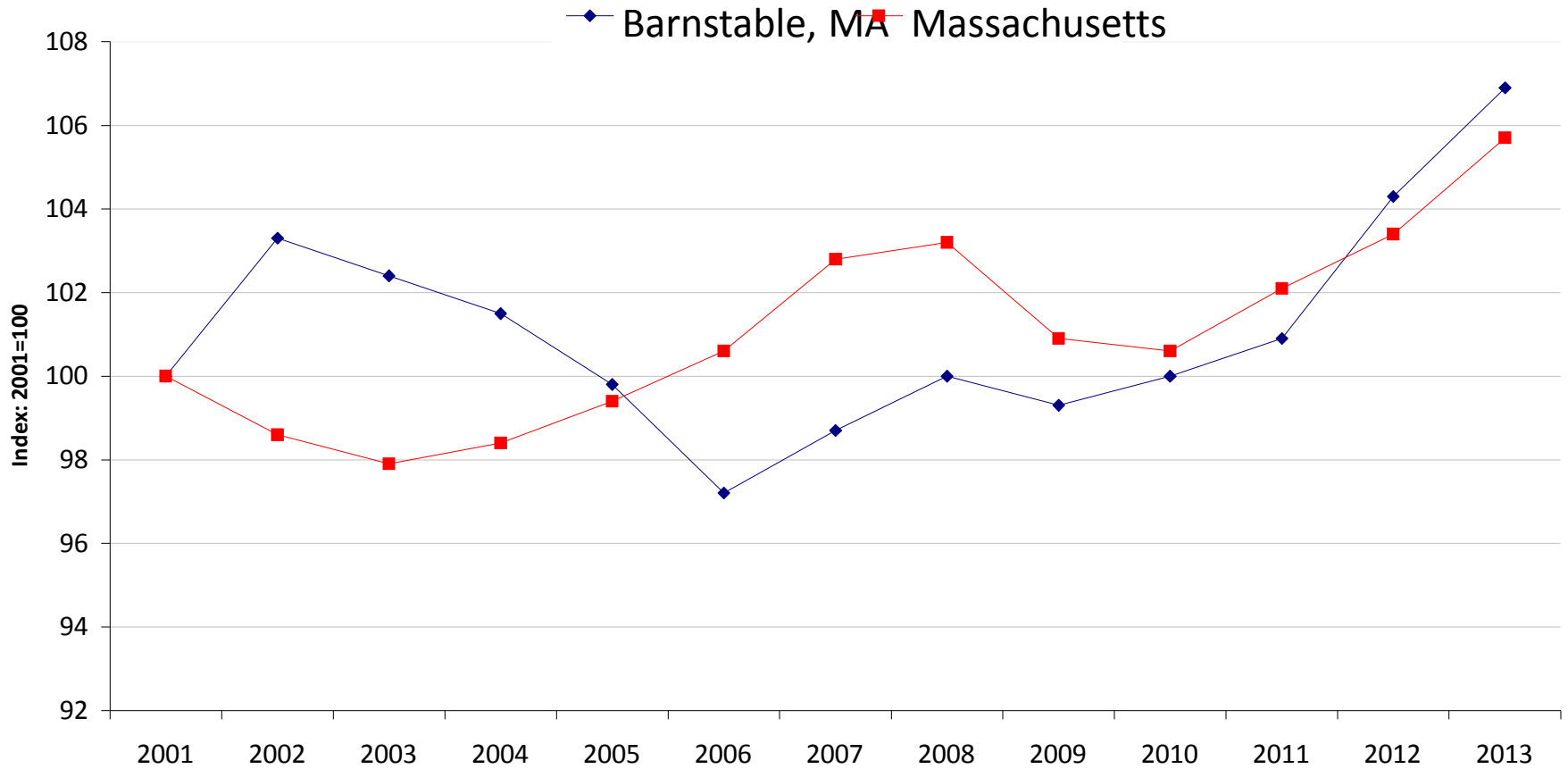
Historical Employment in Barnstable County: Total Jobs Compared to Accommodation and Food Services Jobs



Historical Employment in Retail and Accommodation and Food Services Jobs in Barnstable County



Indices of Total Employment in Massachusetts and Accommodation & Food Service Employment in Barnstable County 2001=100



Regression Model Parameters

Measured traffic as combined top monthly volume of two bridges (not necessarily same month for each bridge) for historical changes in peak seasonal volumes.

Used Accommodations and Food Services (A&FS) employment in Barnstable, Dukes, and Nantucket counties as proxy for visitors crossing the bridges.

Used Barnstable County share of total Massachusetts employment as proxy for non-visitor traffic.

Summary

- The spending of tourists, local visitors from off-Cape, and seasonal home owners are significant contributors to the Cape Cod economy.
- These visitations and spending do not necessarily track with the larger year-round economic conditions and trends.

- To attempt to account for these visitations in the travel demand forecasting and traffic analyses a regression model was developed to consider specific relevant economic and traffic indicators of visitor demand
- The resulting model findings suggest that average annual growth in visitor traffic is expected to range from 0.12% per year to 0.69% per year.
- It may be worth noting that the forecast for statewide employment growth through 2040 is 0.26% per year.

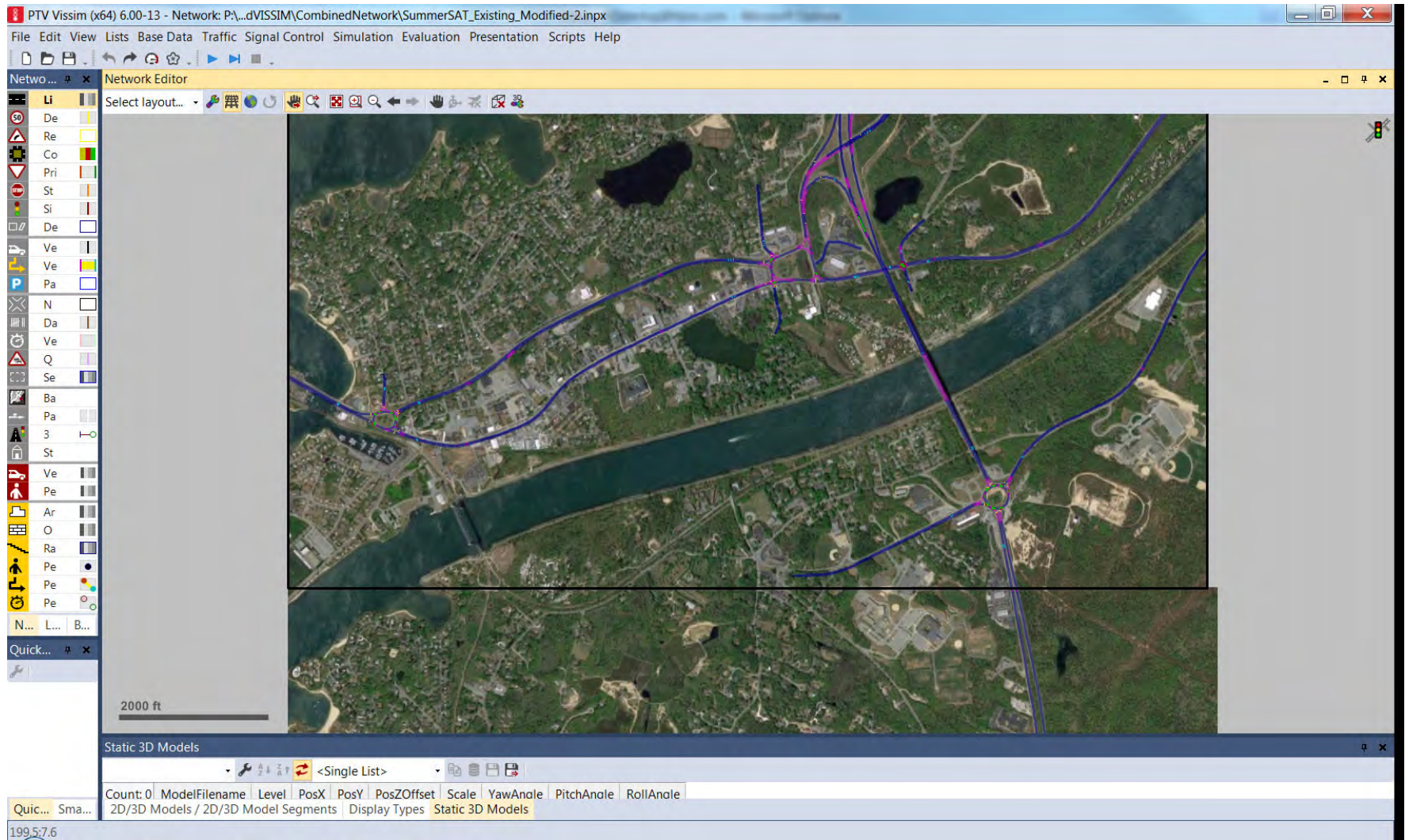
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VISSIM Traffic Demonstration.

VISSIM Example.



Next Steps and Schedule.

Next Steps.

- Upcoming Public Meeting.
- Project and analyze 2040 No-Build Traffic Volumes.
- Begin consideration of improvement alternatives.

Schedule.

		2014			2015												2016		
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
TASK 1	Study Area	■																	
	Goals/Objectives	■																	
	Evaluation Criteria	■																	
	Public Involvement Plan	■																	
	Working Group Meeting		◆																
	Public Meeting				◆														
TASK 2 Existing Conditions, Future No-Build	Existing Conditions/Data Collection																		
	Traffic data/analysis summer and fall	■	■	■	■														
	Crashes	■	■	■	■														
	Land Use/Economic				■	■	■	■	■	■	■	■	■						
	Environmental				■	■	■	■	■	■	■	■	■						
	Public Health		■	■	■	■	■	■	■	■	■	■	■						
	Future Conditions/Model/Analysis				■	■	■	■	■	■	■	■	■						
	Issues and Opportunities				■	■	■	■	■	■	■	■	■						
	Constraints Identification		■	■	■	■	■	■	■	■	■	■	■						
	Working Group Meeting						◆						◆	◆					
TASK 3 Alternatives Development	Public Meeting						◆						◆	◆					
	Working Group Meeting				■	■	■	■	■	■	■	■	■	■	■	◆			
	Public Meeting															◆			
TASK 4 Alternatives Analysis	Mobility/Accessibility Analysis												■	■	■	■			
	Safety Analysis												■	■	■	■			
	Environmental Effects Analysis												■	■	■	■			
	Land Use/Economic Development												■	■	■	■			
	Community Effects/TitleVI/EJ												■	■	■	■			
	Cost Analysis														■	■			
	Working Group Meeting																◆		
	Public Meeting																◆		
																		◆	
TASK 5 Recommendations	Draft report														■	■	■	■	
	Working Group Meeting																	◆	
	Public Meeting																	◆	
TASK 6 Final Report																		■	■

Questions?

Comments and feedback can be emailed to
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