Appendix C.1
ANALYSIS OF AGRICULTURE INDUSTRY IN ST. MARY'S COUNTY

Location and Population Growth

St. Mary's County is bordered on the southwest by the Potomac River, on the southeast by the Chesapeake Bay, on the northeast by the Patuxent River and on the north by Charles County. According to its recent comprehensive plan (2010), St. Mary's County has over 400 miles of shoreline, placing 18.3% (43,700 acres) of the County's land area is within the "critical area" defined under Maryland's Chesapeake Bay. The County ranks fourth among Maryland counties in critical area acreage. The County has a rich historic culture of Chesapeake Bay tidewater farming, fishing and crabbing communities. In the northwest portion of the County, many farms are operated by the Amish and Mennonite communities. Although it is only thirty-eight miles south of the District of Columbia and ninety miles south of Baltimore, the County was historically isolated from the pressures of growth in the Baltimore and Washington metropolitan areas. Figure 1 provides urban areas definition / categorization of Maryland from four major data sources and in all St Mary's County is listed as a rural non-metropolitan county. Since the 1990's, several factors have combined to make St. Mary's County one of the fastest growing counties in Maryland.

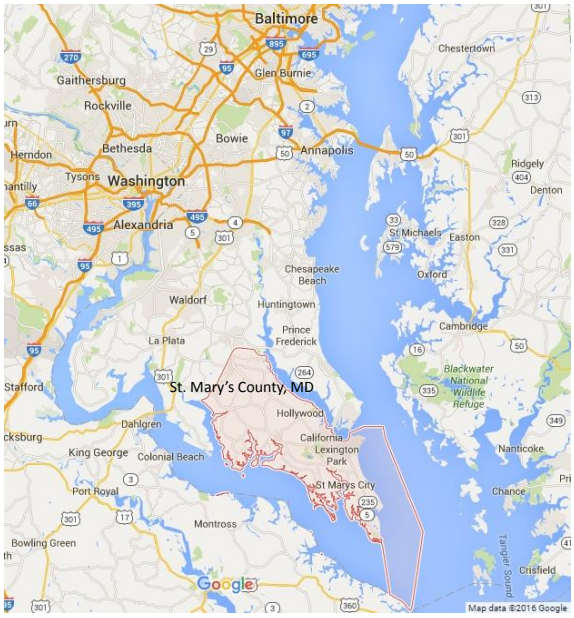
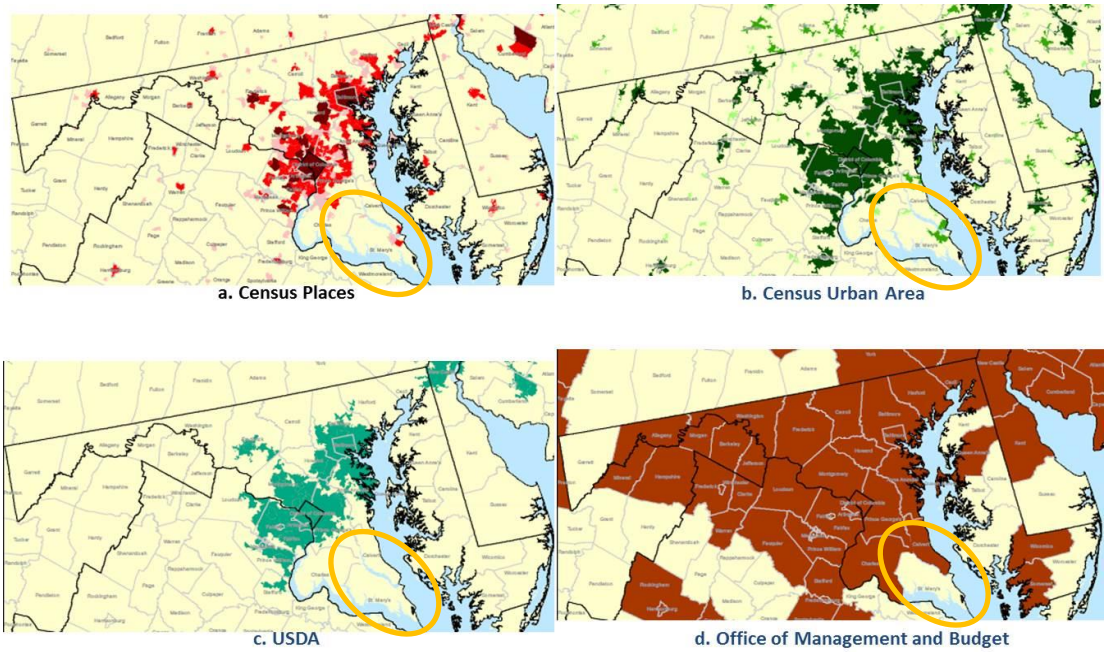


Figure 1 Location of St. Mary's County

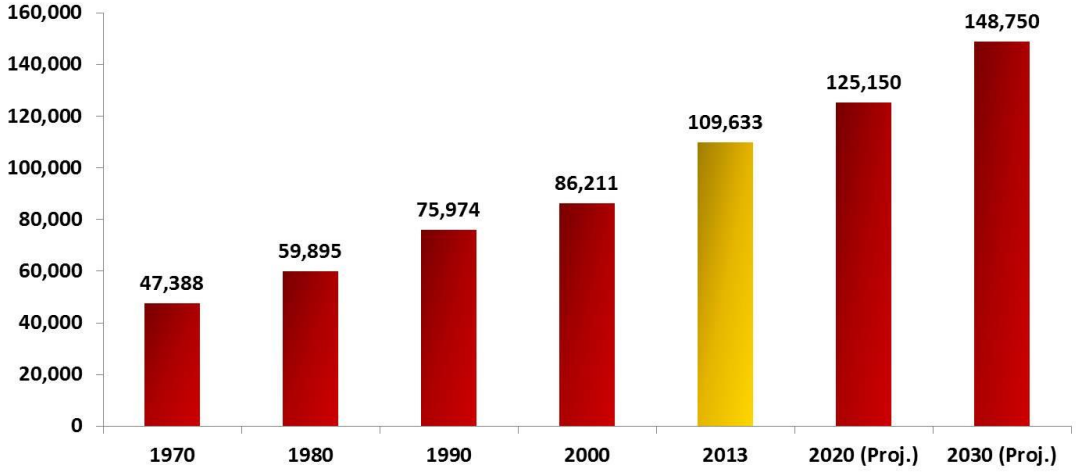
These factors include Patuxent Naval Base and its expansion from the Base Realignment; the growth of St. Mary's College; and the increasing numbers of long-distance Washington D.C. commuters who are attracted to northern St. Mary's County. County population has more than doubled since 1970 (figure 2.1). With a 3.6% annual rate of increase, St. Mary's County was the fastest growing county in Maryland from 2000-2013, compared to a statewide average of 0.9%. (figure 2-2). As projected by Maryland Department of Planning, the high and stable growth rate will continue for the next twenty years. Population in 2030 for St. Mary's County is estimated to be roughly double the 1990 population.

Figure 2: Urban Area Definitions by Four Sources



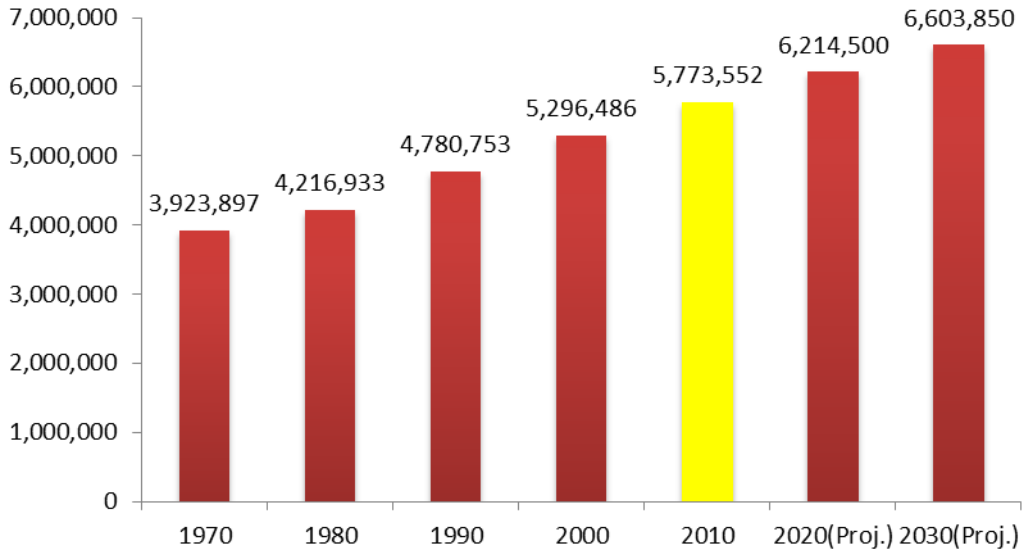
Source: U.S. Census, U.S. Agriculture Census, Office of Management and Budget

Figure 3-1: Population Growth in St. Mary's County



Source: U.S. Census Bureau. Projections 2020 and 2030 are from Maryland Department of Planning, Planning Data Services.

Figure 2-2: Population Growth in Maryland



Source: U.S. Census. Projection 2020 and 2030 are from Maryland Department of Planning, Planning Data Service.

Dynamic Change in Agriculture Sector

In 1995, as part of its agricultural land preservation initiatives, St. Mary's County set a goal of 60,000 acres of farmland in permanent protection. We use U.S. Agriculture Census data to capture the changes in the number of farms, land in farms, and average size of farms, total sales, and averages sales per farm for St. Mary's County and the State of Maryland. The results are shown below in table 1 and table 2.

Table 1: Basic Statistics for Agriculture Sectors in St. Mary's County

					Percent Changes		
	1997	**2002**	**2007**	**2012**	**1997-2002**	**2002-2007**	**2007-2012**
Total Number of Farms							
	658	577	621	632	-12.3%	7.6%	1.8%
Farms by Size (acres)							
1 to 9	67	63	78	62	-6.0%	23.8%	-20.5%
10 to 49	204	204	227	243	0.0%	11.3%	7.0%
50 to 179	253	227	235	259	-10.3%	3.5%	10.2%
180 to 499	74	62	58	47	-16.2%	-6.5%	-19.0%
500 to 999	16	16	17	13	0.0%	6.3%	-23.5%
1,000+	7	5	6	8	-28.6%	20.0%	33.3%
Land In Farms (Acres)							
Total Acres	71,920	68,153	68,648	67,086	-5.2%	0.7%	-2.3%
Average Size	109	118	111	106	8.1%	-6.4%	-4.0%
Farm Sales							
Total Sales*	$32,917	$17,412	$15,947	$21,800	-47.1%	-8.4%	36.7%
Average Sales Per Farm**	$50.03	$30.18	$25.68	$34.49	-39.7%	-14.9%	34.3%

Note: * Market Value of Total Agricultural Product Sold, in 2012 constant dollar (Thousands of Dollars);

** Average Market Value of Total Agricultural Products Sold per Farm, in 2012 constant dollar (Thousands of Dollars);

Source: U.S. Census of Agriculture, County Data

Table 2: Basic Statistics for Agriculture Sectors in Maryland

	1997	2002	2007	2012	Percent Changes 1997-2002	2002-2007	2007-2012
Number of Farms							
	13,254	12,198	12,834	12,256	-8.0%	5.2%	-4.5%
Farms by Size (acres)							
1 to 9	1,407	1,418	1,554	1,481	0.8%	9.6%	-4.7%
10 to 49	3,828	4,412	4,589	4,554	15.3%	4.0%	-0.8%
50 to 179	3,825	3,583	4,067	3,695	-6.3%	13.5%	-9.1%
180 to 499	2,038	1,836	1,719	1,594	-9.9%	-6.4%	-7.3%
500 to 999	617	562	539	553	-8.9%	-4.1%	2.6%
1,000+	369	387	366	379	4.9%	-5.4%	3.6%
Land In Farms (Acres)							
	2,193,063	2,077,630	2,051,756	2,030,745	-5.3%	-1.2%	-1.0%
Average Size	168	173	162	169	2.7%	-6.1%	4.0%
Farm Sales							
Total Sales*	$2,188,165	$1,846,457	$2,273,222	$2,271,397	-15.6%	23.1%	-0.1%
Avg. Sales Per Farm**	$165	$151	$177	$185	-8.3%	17.0%	4.6%

Note: * Market Value of Total Agricultural Product Sold, in 2012 constant dollar (Thousands of Dollars);

** Average Market Value of Total Agricultural Products Sold per Farm, in 2012 constant dollar (Thousands of Dollars);

Source: U.S. Census of Agriculture, County Data

The number of farms declined during the period from 1997 (658 farms) to 2002 (577 farms), but that trend reversed in 2007 with a jump to 621 farms, and continued to grow slightly to 632 farms in 2012. From 2002 to 2007 the County saw a 7.6% increase in the number of farms, which is larger than the statewide increase (+5.2%). Statewide the number of farms declined from 2007 to 2012 by 4.5% while the County added 11 farms to its total number. The number of farms is relevant because each farm offers employment and ownership opportunities for residents.

In 2012, the Census of Agriculture counted 67,086 acres of land in farms in St. Mary's County, which is a decrease from the previous 1997, 2002 and 2007 levels. Meanwhile, for the same three five-year intervals, there was also a similar trend statewide. St. Mary's County's gross loss of farmland from 1997 to 2012 (-6.7%) was slightly less than the statewide percentage loss (-7.4%).

On average the County has smaller farms than the State of Maryland, and substantially smaller than the national average. The average for the County was 106 acres in 2012 compared to 169 acres for Maryland. According to the US agriculture census (issued in Feb 2014), in 2012, the average farm size nationwide was 434 acres.

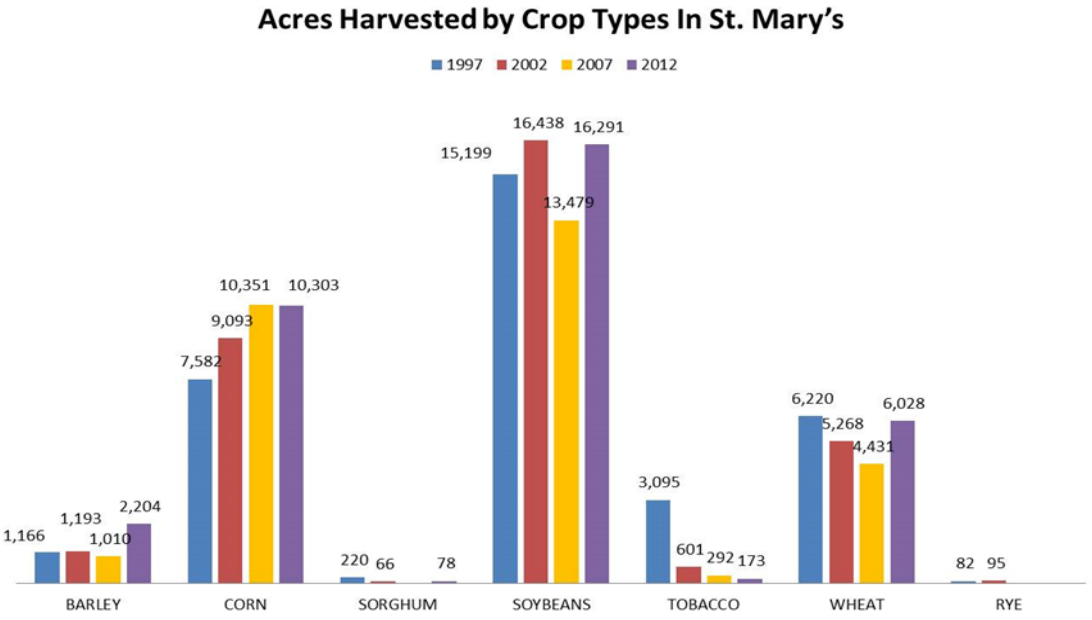
The decline in the total value of 1997 to 2002 sales of agricultural products in St. Mary's County was significant and primarily due to the buyout program for tobacco—the most profitable County and statewide crop. The sales decline trend eased during the 2002-2007 period with a more moderate percentage loss (-8.4%), rebounding with an increase of sales (+36.7%) during the past five years from 2007 to 2012.

However, County farms realized less than one-third of the total sales value per farm compared to the statewide average. In 2012, the average farm in the State brought in five times the revenue of an average St. Mary's farm. In St. Mary's County, the average farm generated $.33 in sales per acre, whereas in the state, the average farm generated $1.09 per acre sales.

For the County to meet its goal of preserving farmland and retaining the agricultural way of life, economic development strategies must find ways to improve the profitability of County farms. Farm size is a factor. Whereas 21% of Maryland farms are 180 acres or larger, only 11% of St. Mary's farms fall in this range. While the percentages of farms below 50 acres are comparable, 41% of St. Mary's farms fall within the 50-179 acre range compared to just 30% statewide. Economic development strategies should pay particular attention to increasing the sales and profitability of farms in the 50-179 acre range, followed by those in the 15-49 acre range. Together these two groups account for 79% of St. Mary's County farms.

The major land use in farms is still cropland, with a high 61% share of total farmland in crops. As figure 3 below indicates, soybeans, corn, wheat and barley are the main crop types in the County even with some fluctuations in production. Due to the tobacco buyout program, tobacco production dropped dramatically after 1997. Historically tobacco was a significant cash crop in St. Mary's and Southern Maryland due to favorable soils, climate and shipping access. The dramatic decline in total sales and average sales per farm in the County, 1997 to 2002, is mainly due to the Tobacco Buyout program. See figures 4, 5, and 6.

Figure 3: Major Crops in St. Mary's County



Source: U.S. Department of Agriculture. Census of Agriculture, NASS, November 2014.

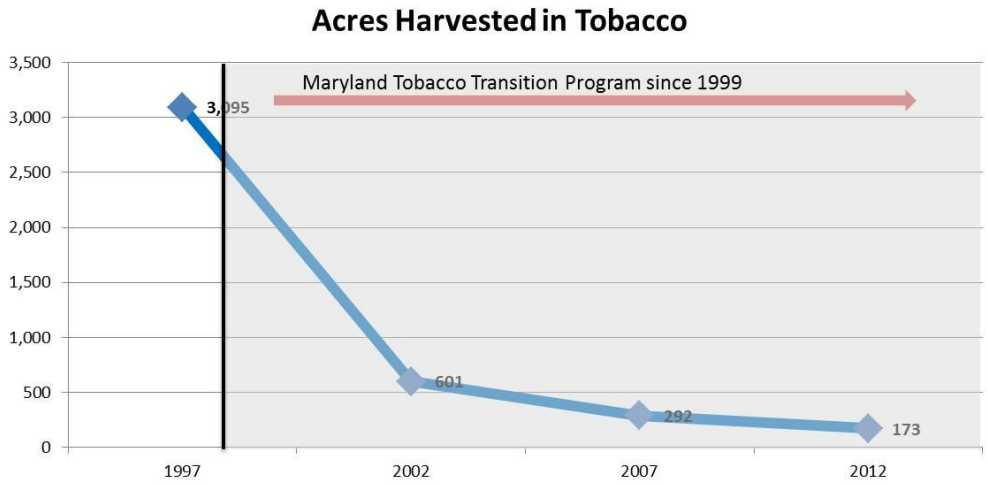
Tobacco Buyout Program

In November 1998, The Master Settlement Agreement (MSA) was reached between the state Attorneys General of forty-six states, five U.S. territories, the District of Columbia and the five largest tobacco companies. MSA set standards for, and imposed restrictions on, the sale and marketing of cigarettes by participating cigarette manufacturers.

In 1999, Maryland began its tobacco buyout program by using $78 million of a $4 billion share of the national tobacco settlement with cigarette manufacturers. The program allocates the $78 million over 10 years, each year paying tobacco farmers $1 per pound based on the average amount of tobacco they produced between 1996 and 1998. To qualify for the program, a farmer should: (1) have grown tobacco in 1998, (2) must permanently quit tobacco cultivation, and (3) converted his land to other agricultural uses for at least 10 years. This tobacco buyout program is designed to transition

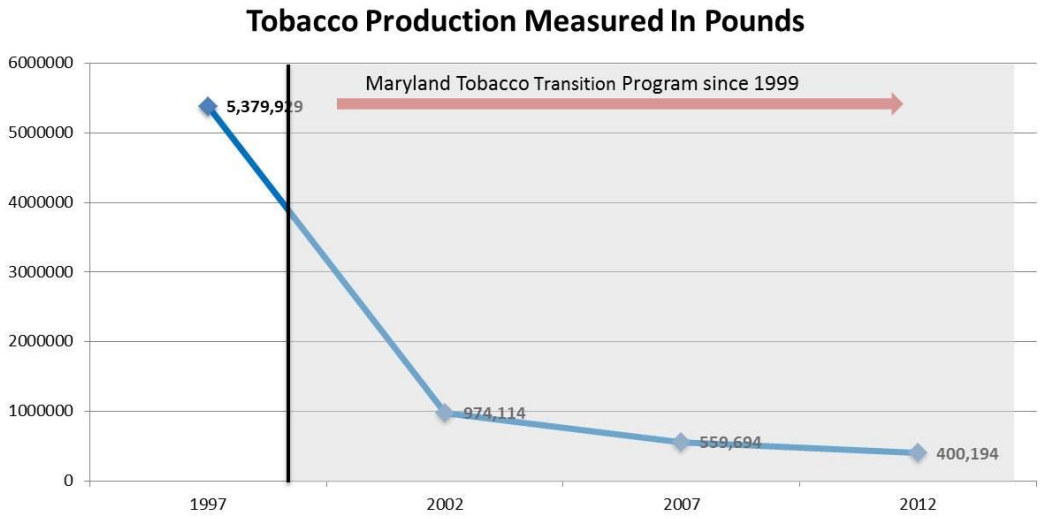
Maryland farmers, especially those in the traditional southern Maryland cultivation region, out of tobacco production into more profitable and life-sustaining crops. Figure 4, 5 and 6 demonstrate the significant impact of the buyout program on St. Mary's county's tobacco industry. In 2002, the harvested acreage, production and sales value for tobacco drastically dropped to only 1/6 of the pre-buyout level in 1997. There were less dramatic but stable declines thereafter, from 2002 to the recent 2012. The losses required a major agricultural industry readjustment, requiring a campaign for increasing demand for local produce and more value added products.

Figure 4: Harvest Tobacco Acreage in St. Mary's County



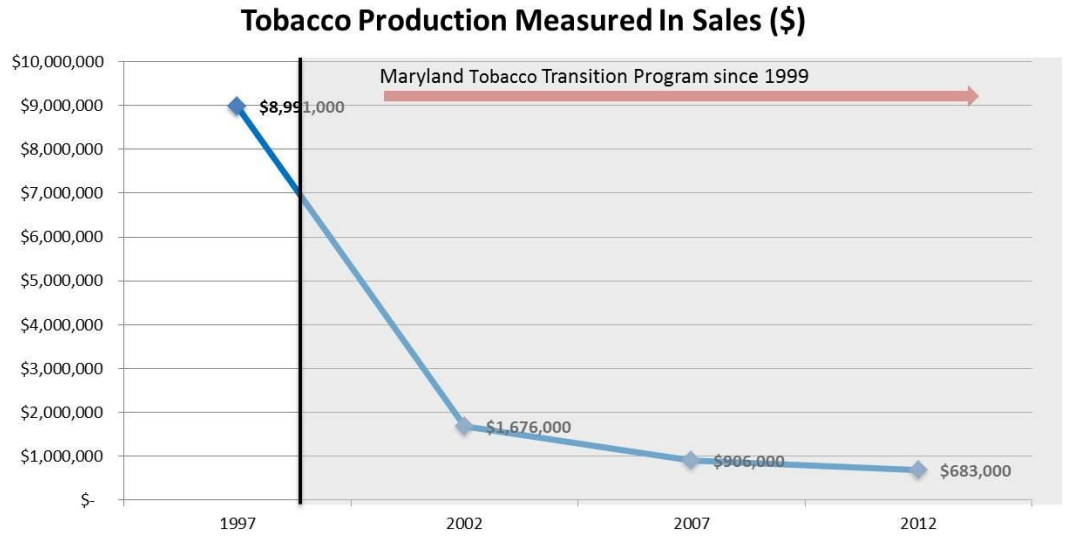
Source: U.S. Department of Agriculture. Census of Agriculture, NASS

Figure 5: Tobacco Production (in pounds) in St. Mary's County



Source: U.S. Department of Agriculture. Census of Agriculture, NASS

Figure 6: Tobacco Production Measured in Sales ($) in St. Mary's County



Source: U.S. Department of Agriculture. Census of Agriculture, NASS
U.S. Census of Agriculture, County Data, 2012

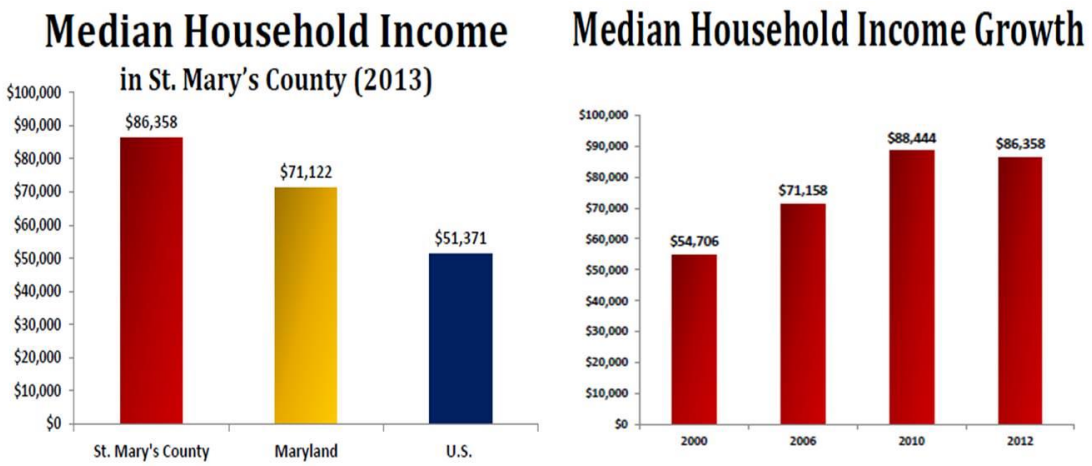
Note: The sales dollar is in 2012 constant dollar

Employment and Income for Agriculture

Surrounded by high-tech jobs, federal employment, recreation jobs, as well as the DC commuters, the County maintained a low unemployment rate of less than 6% in 2012 The County rate ranks 6th lowest in unemployment among the whole state of Maryland.

Since 2002, the unemployment rate has been consistently below the state and national averages. Not surprisingly, the income level in St. Mary's is high. According to figure 7, below, the County's $86,358 median household income in 2013 is much higher than both the state and national average. From 2006-2012, the County with a total 21% growth rate, achieved the highest median household income growth rate in the state.

Figure 7: Median Household Income and Growth Trend in St. Mary's County



Source: U.S. Census Bureau

However, as shown below in table 3, farm employment and income tells another story. In 1997, each farm supported 1.5 full-time jobs. By 2002, the average employment per farm dropped to 1 worker per farm. The small labor-to-farm ratio also provides evidence for the small-scale farm operation trend in the County. However, the method of counting employment biases farm employment downwards. The Bureau of Economic Analysis only accounts for the paid non-family workers and labor employed 200 days or more in the farm. Thus, the data for St. Mary's may undercount total farm employment. We know that for some regions, for example, the South and California with a lot of seasonal immigrant labor, total farm employment is vastly underestimated.

Table 3: Basic Statistics for Farm Employment and Income in St. Mary's County

	1997	2002	2007	2012
Number of Farms	658	577	621	632
Farm Employment(number of jobs)*	885	597	630	633
Total Farm Income**	$42,455,580	$31,392,740	$30,569,790	$40,317,000
Total Farm Income per farm	$64,522.16	$54,407	$49,227	$63,793
Realized Net Farm Income***	$7,339,860	$3,027,220	$2,504,760	$10,070,000
Net Farm Income per farm	$11,155	$5,246	$4,033	$15,934

Note: All dollar estimates are in 2012 constant dollars (adjusted for inflation).

*Includes all operators, by any or 200 Days or more employed in the farms

**Total Farm Income=Cash receipts from marketing + Government payments + value of home consumption and other farm related income components

***Realized Farm Net Income=Total Farm Income – Production Expense

Source: U.S. Census of Agriculture, County Data;

U.S. Bureau of Economic Analysis, by County, Table CA25N, Table CA45, updated May 05, 2014;

After converting values into 2012 constant dollars, the change of total farm income and net farm income in the past 15 years demonstrate the significant impact of the tobacco buyout program. Farm income dropped dramatically after 1997, and continued to worsen the next ten years until 2007. Farm incomes then rebounded between 2007 to 2012 with 2012 total income back to and exceeding the 1997 level. The low net farm income, although with a significant increase in 2012, adds to the challenge of retaining the County's farming and agricultural lifestyle.

Land Use Changes 2002-2010

Land use patterns, especially shoreline and agricultural preservation are critical for retaining the County's rural image and appeal. Urban sprawl and the loss of farmland and waterfront threaten the County's rural character. In this section we consider detailed land use changes in St. Mary's County from 2002 to 2010. We use the Maryland Land Use/Land Cover data prepared by the Maryland Department of Planning to geographically capture the details of land use changes in the County[1].

[1] MDP has produced a statewide Land Use/Land Cover map, representing different points in time. MDP currently makes the 1973, 2002 and 2010 datasets available. The MDP Land Use/Land Cover dataset uses the Anderson Level 2 Classification System, a standard classification system used by land planners, to display land use/land cover for each county and Baltimore City, This dataset is representative of both statewide and county trends in development (acres by type), and its primary purpose is to track the conversion of resource land to development.

Land use/land cover information for the entire State of Maryland is initially developed using high altitude aerial photography and satellite imagery, and provided based on imagery and parcel data (MDProperty View). The MDProperty View data is tax-investigation based property value parcel data. For the most recent 2010 data, the Land Use/ Land Cover information were updated using 2007 National Agriculture Imagery Program (NAIP) aerial imagery and parcel information from the 2008 Edition of MDProperty View data.

--(Continued footnote1) Here, in order to do visual analysis of the land use changes in St. Mary's

The MDP Land Use/Land Cover data classifies the "Urban Land" into eight types: (1) Low-density residential land—detached single-family/duplex dwelling units, yards and associated areas, with 0.2 dwelling units/acre to 2 dwelling units/acre. (2) Medium-density residential—detached single-family/duplex dwelling units, yards and associated areas, with 2 dwelling units/acre to 8 dwelling units/acre; (3) High-density residential land— attached single-unit row housing, garden apartments, high-rise apartments/condominiums, mobile home and trailer parks, with more than 8 dwelling units per acre; (4) Commercial—Retail and wholesale services; (5) Industrial; (6) Institutional, such as schools, military installations, churches, medical and health facilities, and government offices and facilities; (7) Extractive –surface mining operations; (8) Open urban land - Urban areas whose use does not require structures, or urban areas where non-conforming uses characterized by open land have become isolated. The "Agriculture Land" is categorized into six types: (1) Cropland; (2) Pasture; (3) Orchards/vineyards/horticulture; (4) Feeding operations—for animals, such as cattle feed lots, hog feeding lots, poultry houses; (5) Agricultural buildings, such as breeding and training facilities, storage facilities, built-up areas; (6) Row and garden crops.

Analysis of the Maryland Department of Planning Land Use and Land Cover mapping indicates that (as shown in below table 4), in 2002, there were 60,307 acres of land

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County in the past decade, we use the only available 2002 and 2010 MDP data, instead of keeping consistent with previous section of this report which adopted 2002 and 2012 U.S. Agriculture Census data. Therefore the statistics in this section as well as the following sections may differ slightly from those shown in table 1.

described as agriculture land use and 48,242 acres of land described as urban land use. In 2010, the acreage of agriculture land use dropped to 51,511 acres, while the urban land uses increased to 51,284 acres. There is a 14.6% drop in agriculture land along with a 6.3% increase in urban land use during the same time period. Table 4 also lists the details and changes for each type of both agriculture and urban land uses.

Table 4: Land Use Change in St. Mary's County

	Land Use in Acres		Land Use Change	
	2002 Acres	2010 Acres	2002-2010 Acres	Percent
Agriculture				
Cropland	54,358	46,969	-7,390	-13.6%
Pasture	5,349	3,950	-1,400	-26.2%
Orchards/vineyard/horticulture	23	20	-3	-12.6%
Feeding operations	22	59	37	164.0%
Agricultural building	108	144	36	33.4%
Row and garden crops	445	369	-76	-17.1%
Total	**60,307**	**51,511**	**-8,796**	**-14.6%**
Urban				
Low-density residential	31,774	34,529	2,755	8.7%
Mid-density residential	5,096	4,715	-381	-7.5%
High-density residential	717	815	98	13.6%
Commercial	3,203	3,065	-138	-4.3%
Industrial	394	501	107	27.1%
Institutional	6,089	6,793	704	11.6%
Extractive	233	221	-12	-5.1%
Open urban land	735	644	-91	-12.4%
Total	**48,242**	**51,284**	**3,042**	**6.3%**

Source: MDProperty View Data, Maryland Department of Planning

These total urban/agricultural changes are net numbers and do not solely imply a shift of an agricultural parcel to an urban use. There are possibly land use changes into and out of other categories of land use, such as:

(1) Forest land

(2) Water - Rivers, waterways, reservoirs, ponds, bays, estuaries, and ocean.

(3) Wetlands - Forested or non-forested wetlands, including tidal flats, tidal and non-tidal marshes and upland swamps and wet areas.

(4) Barren land

(5) Transportation - Miscellaneous transportation features not elsewhere classified. Includes park and ride facilities and transit stations.

The net land use change numbers in table 5 and table 6 indicate that among the total 11,619 acres loss of agricultural lands since 2002, there are 4,865 acres converted into urban land uses, approximately 6,754 acres shifted out of the agriculture into one of these alternative land uses.

Table 5: Aggregate Land Use Change in St. Mary's County 2002-2010

	Land Use Change (2002-2010) in Acres						
	Net Changes	Remained from 2002	Percentage*	Lost After 2002	Percentage**	Newly Increased After 2002	Percentage***
Agriculture Land	**-8,796**	48,688	80.7%	-11,619	-19.3%	2,823	5.5%
Urban Land	**3,042**	39,916	82.7%	-8,326	-17.3%	11,368	22.2%

*Note: * & ** Compared to the 2002 Agriculture/Urban Land Acreage; *** Compared to the 2010 Agriculture/Urban Land Acreage*

Source: MDProperty View Data, Maryland Department of Planning

Table 6: 2010 Urban Lands Converted from 2002 Agriculture Lands

		Total (Acres)	**Percentage**
2010 Urban Lands Converted from 2002 Agriculture Lands		**4,865**	**100%**
Converted Categories:	Low-density residential	4,023	82.7%
	Mid-density residential	150	3.1%
	High-density residential	10	0.2%
	Commercial	259	5.3%
	Industrial	51	1.0%
	Institutional	299	6.1%
	Extractive	43	0.9%
	Open urban land	31	0.6%

Source: MDProperty View Data, Maryland Department of Planning

Agriculture Land Use Change

A total of 11,619 acres of County agricultural land was converted out of agricultural use between 2002 and 2010. Over the same period, a total of 2,823 new acres were converted to agricultural land, resulting in a total 8,796 acres net loss of agricultural land. Among different types of lands uses, cropland still leads the agriculture land use, although with a total 7,390 acreage loss from 2002 to 2010 (-13.6%). Other plant or cultivation land use such as orchards/vineyards/horticulture, pasture, and row and garden crops have experienced a similar loss in acreage from 2002 to 2010 of -12.6%. The land used for agriculture related facilities such as feeding operations and agricultural buildings are fast growing during those years with 164% and 33.4% increases respectively, although the total acreage is small.

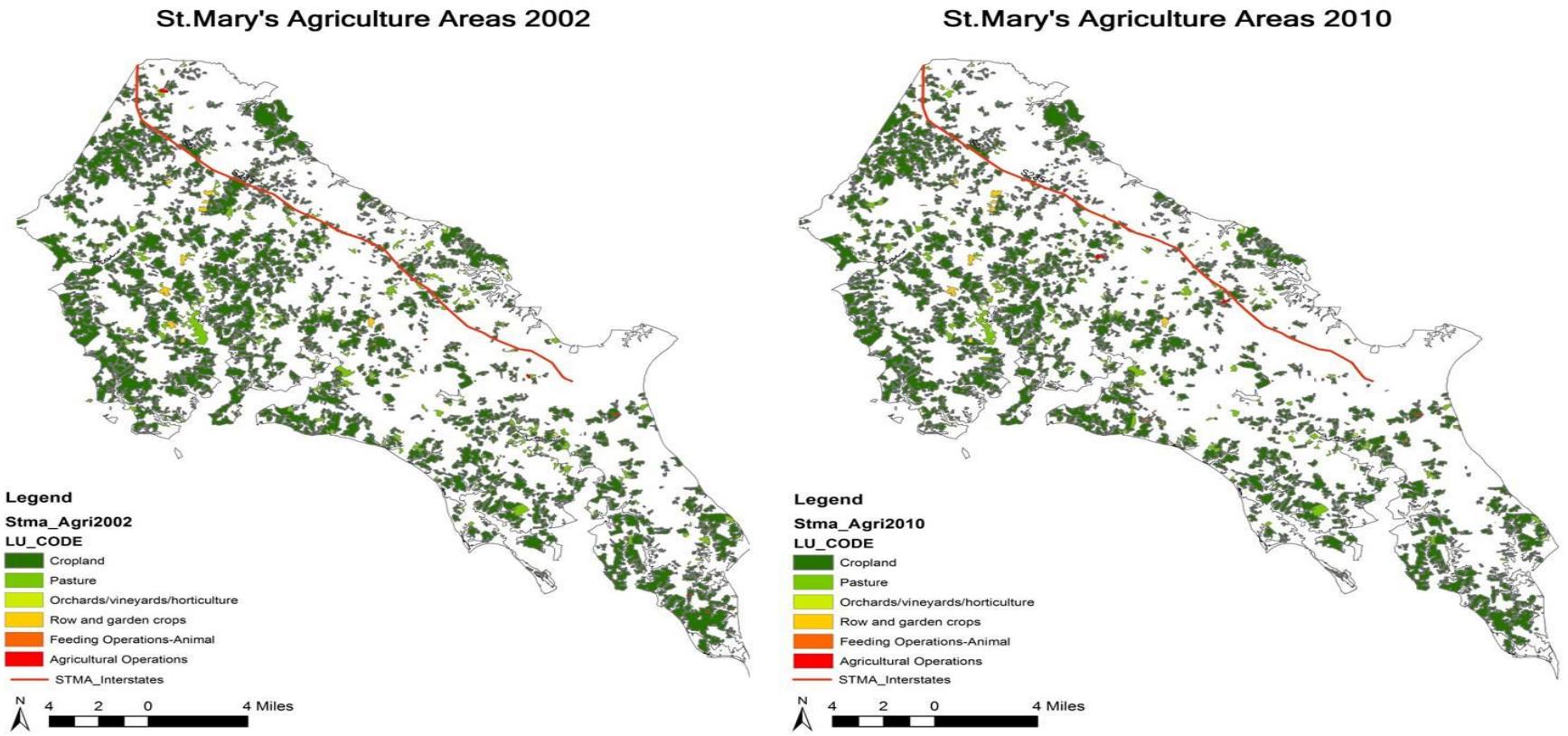
According to St. Mary's County 2010 Comprehensive plan, the County set up Rural Preservation Districts (RPD) to preserve farmland. RPD zoning consists of 182,558 acres (St. Mary's County 2010 Comprehensive plan). The acreage is substantially larger than land zoned agriculture because it includes land outside designated growth areas—including forests, rural subdivisions, farmstead lots, and vacant lands.

The RPD areas are mainly the parcels selected for having an existing concentration of profitable agricultural or forestry enterprises or being large enough to support commodity crops (predominately corn, wheat, soybeans), fodder and feed operations,

small to medium scale livestock operations, equine operations, and specialty farm operations (including organic farming). Preservation of these agriculture lands is anticipated to help stabilize the County's heritage and rural character. Figure 8-1 shows that location of agricultural land uses, and consistent with table 4, the majority share of agricultural land use is cropland.

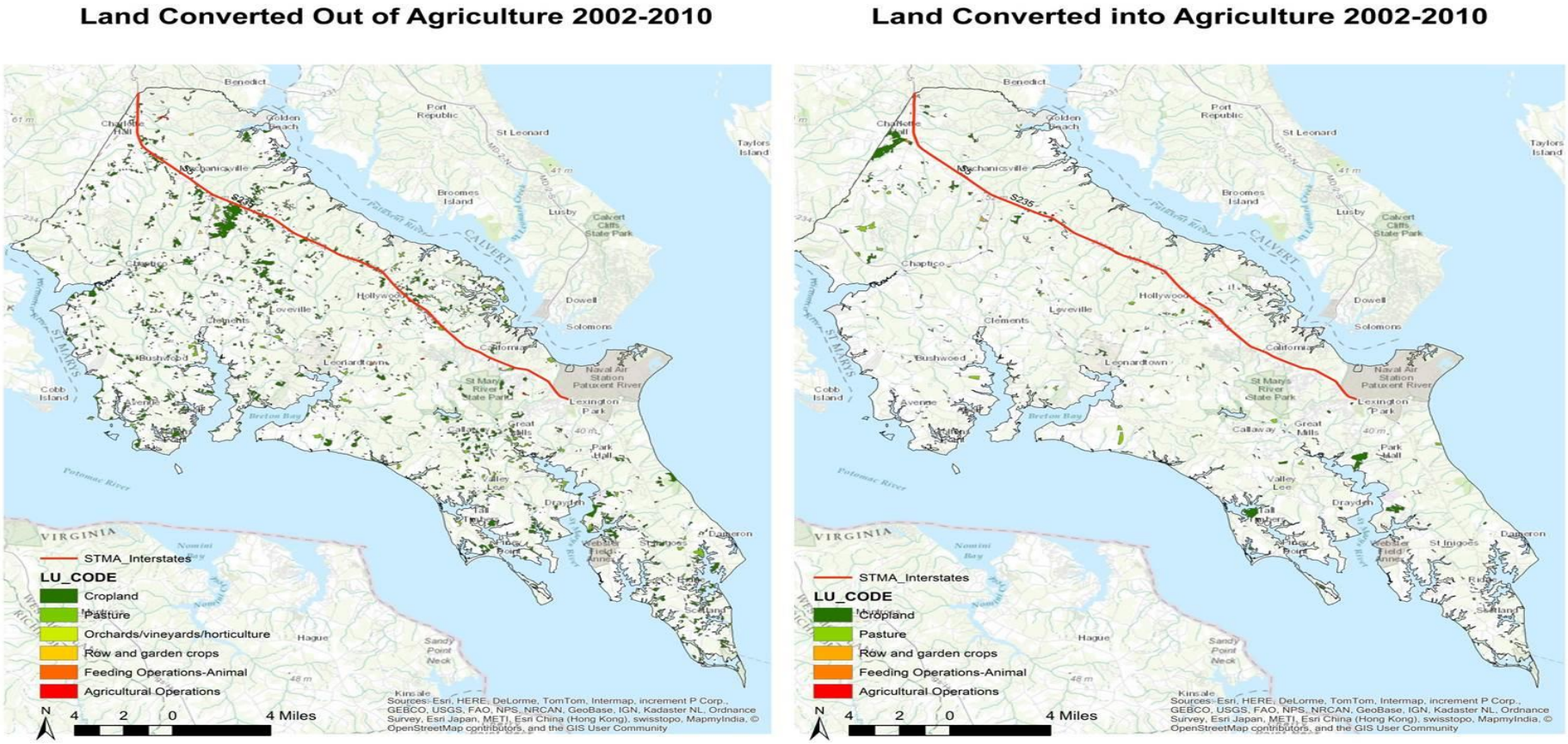
Figures 8-1 shows the agricultural land in 2002 and 2010 and figure 8-2 shows the parcels that went into and out of agriculture. Combining the agriculture conversion data with St. Mary's County's jurisdictional location map in figure 8-2, it is obvious that the general transition of land out of and into agriculture is geographically scattered. The largest concentrated areas of new agriculture land and consistently agriculture land is in the northwest Charlotte Hall areas. This may be explained by the fact that many of the farms in the northwest portion of the County are operated by the Amish and Mennonite communities.

Figure 8-1: Agriculture Land Use Change in St. Mary's County 2002-2010



Source: MDProperty View Data, Maryland Department of Planning

Figure 8-2: Agriculture Land Use Change in St. Mary's County 2002-2010



Source: MDProperty View Data, Maryland Department of Planning

Urban Land Use Change

A total 11,368 acres have been converted into urban uses between 2002 and 2010. Over the same period, 8,327 acres transitioned out of urban uses. Thus, the total gain in urban land was 3,041 acres. See table 5. Not all of the urban land transitioned to agriculture and vice versa. Figure 9-1 below shows the coverage of urban land parcels are dispersed across the County. Although scattered, there are a few concentrations of developments, mainly along the major interstate—S235 and around the County seat of Leonardtown and fast-developed Lexington Park areas.

As calculated in table 4 and geographically illustrated in figures 9-1 and 9-2, residential land still accounted for the major urban land use and the largest share of the acreage increase. The residential land portion of total urban lands grew from 77.9% to 78.1%.

The residential growth was largest in low density development. As shown in table 4, the low-density residential developments increased, a total of 2,755 acres from 2002 to 2010, mid-density residential land use dropped slightly with a total 381 acres decrease, and the high-density residential lands almost keep the same level during the time period. The low-density residential land use grew in St. Mary's at a 8.7% rate. Figure 10 shows the detailed map of residential land use and further demonstrates the growth of low density residential and its spread throughout the County.

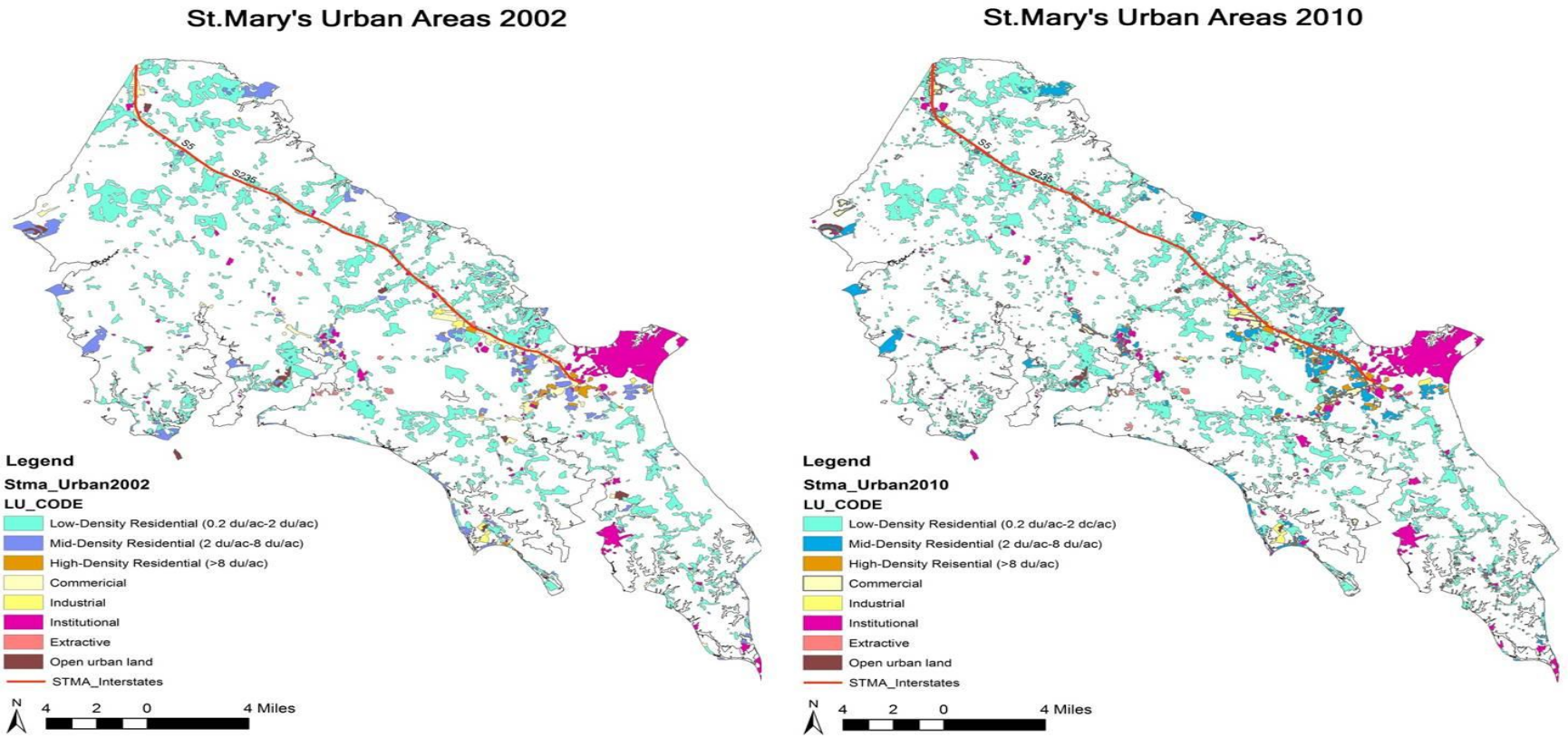
Table 6 lists the numbers for land that transferred from agricultural to urban land only from 2002 to 2010, a total of 4,865 acres. Recall, land uses may switch between other

categories, such as forestry, vacant, transportation, etc. Of the 4,865 acres, 4,023 acres switched to low density residential development from 2002 to 2010, which constitutes 82.7% of the total 4,865 acres of agricultural land lost to urban land during the same time period. Institutional land use ranked as the second biggest absolute land acreage increase, receiving 299 acres of agricultural land. This is not due to the expansion of the Patuxent Naval Station, but rather appears to be the building of several schools in the County.

The agricultural focus group held with the St. Mary's Agricultural Service Center, in

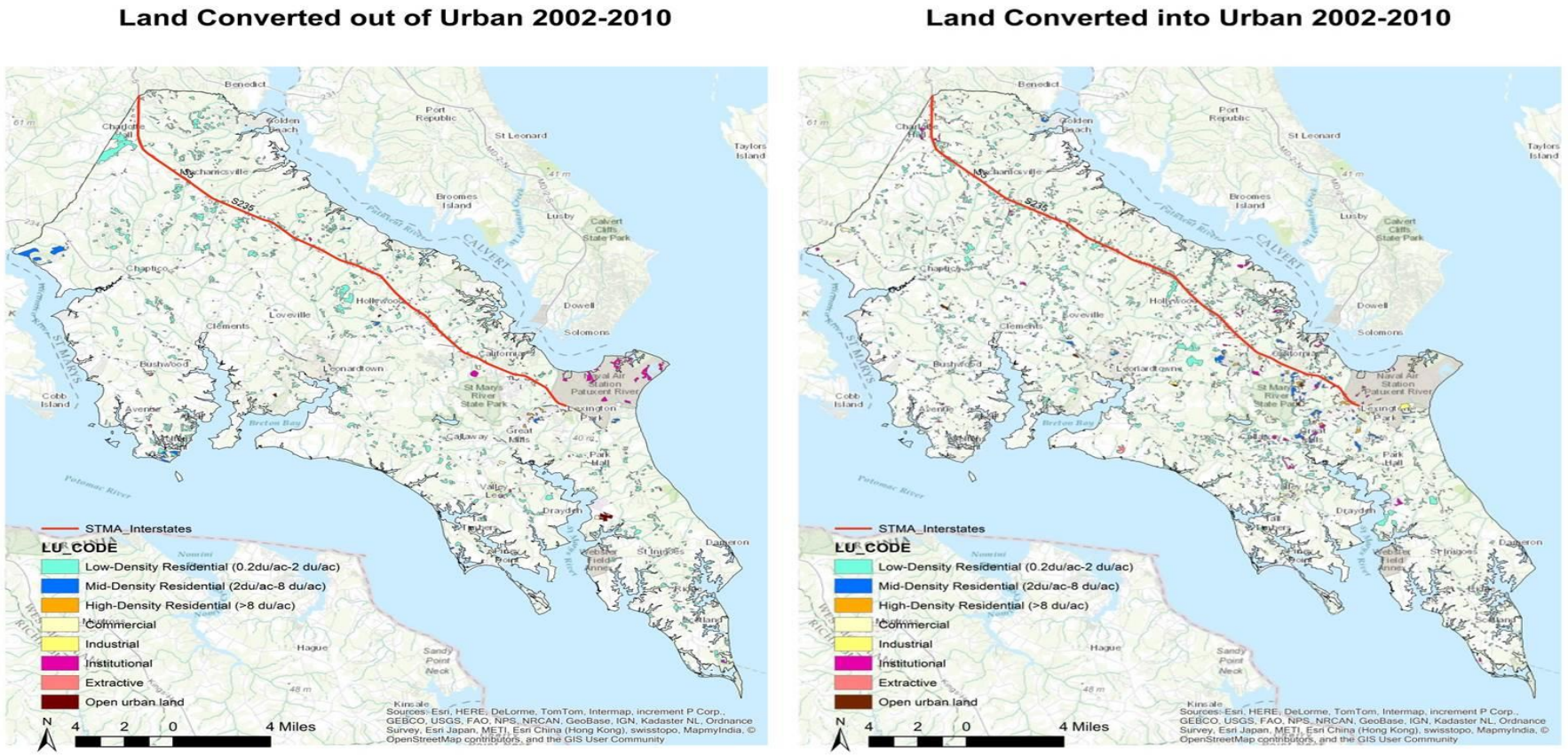
Leonardtown, MD on December 11, 2014 and interviews with agricultural extension workers in the County highlighted farmers' concern about the encroachment of residential development into farming areas. Land use conflicts arise when homeowners complain especially about the use of pesticides, fertilizer smells, and tractor traffic, activities required for successful farming. Given the degree to which the agricultural land is lost to low density residential and the degree to which the map in figures 10 and 11 show the dispersed pattern of new low density residential developments we went further to test: the spatial relationships between newly converted agricultural-to-urban land parcels. Are the converted lands randomly spread throughout the County or associated with existing urban developments? Figure 10 shows the pattern of newly increased residential land, 2002 to 2010 and figure 11 shows the pattern of agricultural land newly converted to all urban uses. We can see that most of the conversions were to low density residential and very little to high density residential, commercial, industrial, and institutional.

Figure 9-1: Urban Land Use Change in St. Mary's County 2002-2010



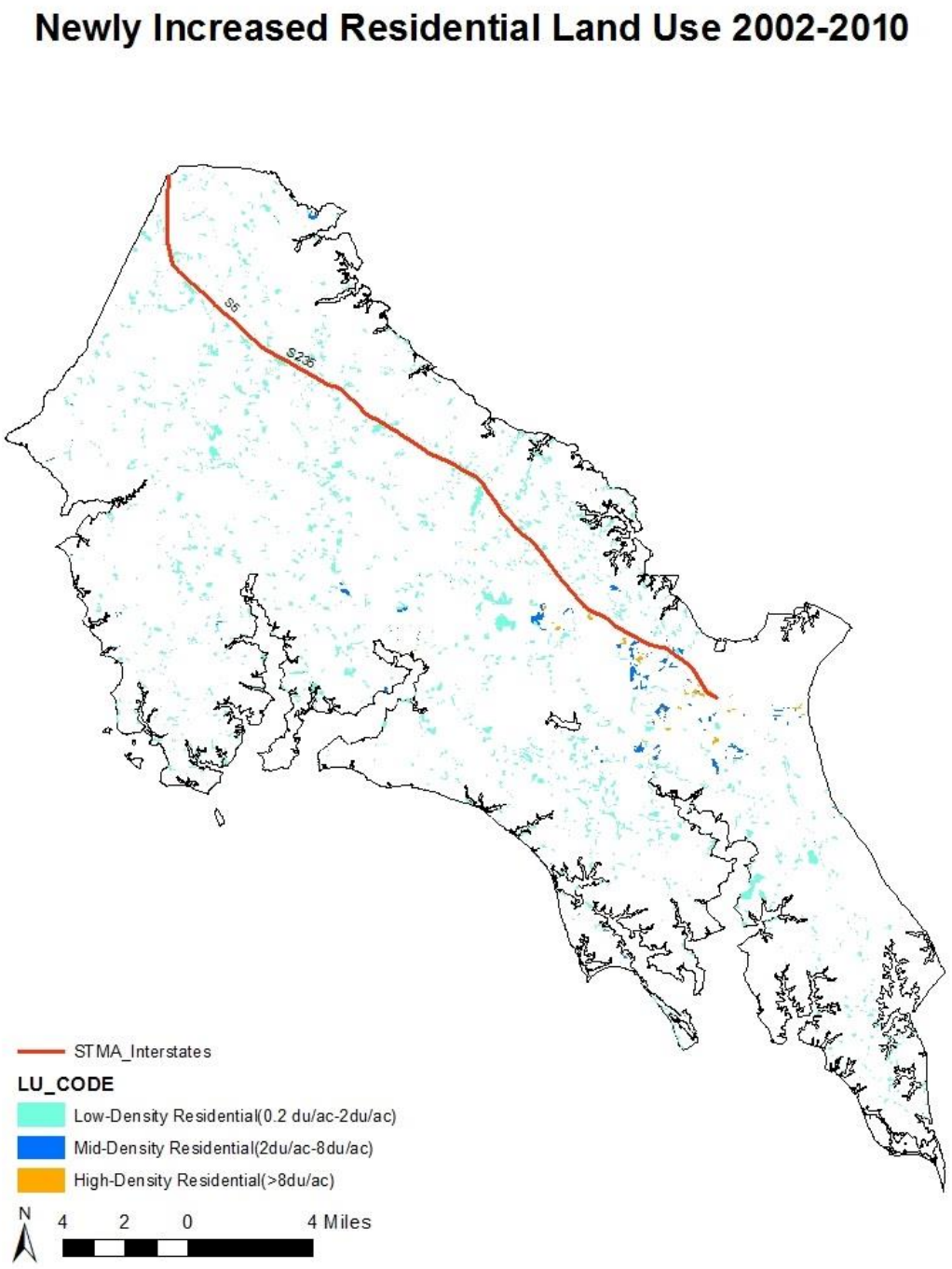
Source: MDProperty View Data, Maryland Department of Planning

Figure 9-2: Urban Land Use Change in St. Mary's County 2002-2010



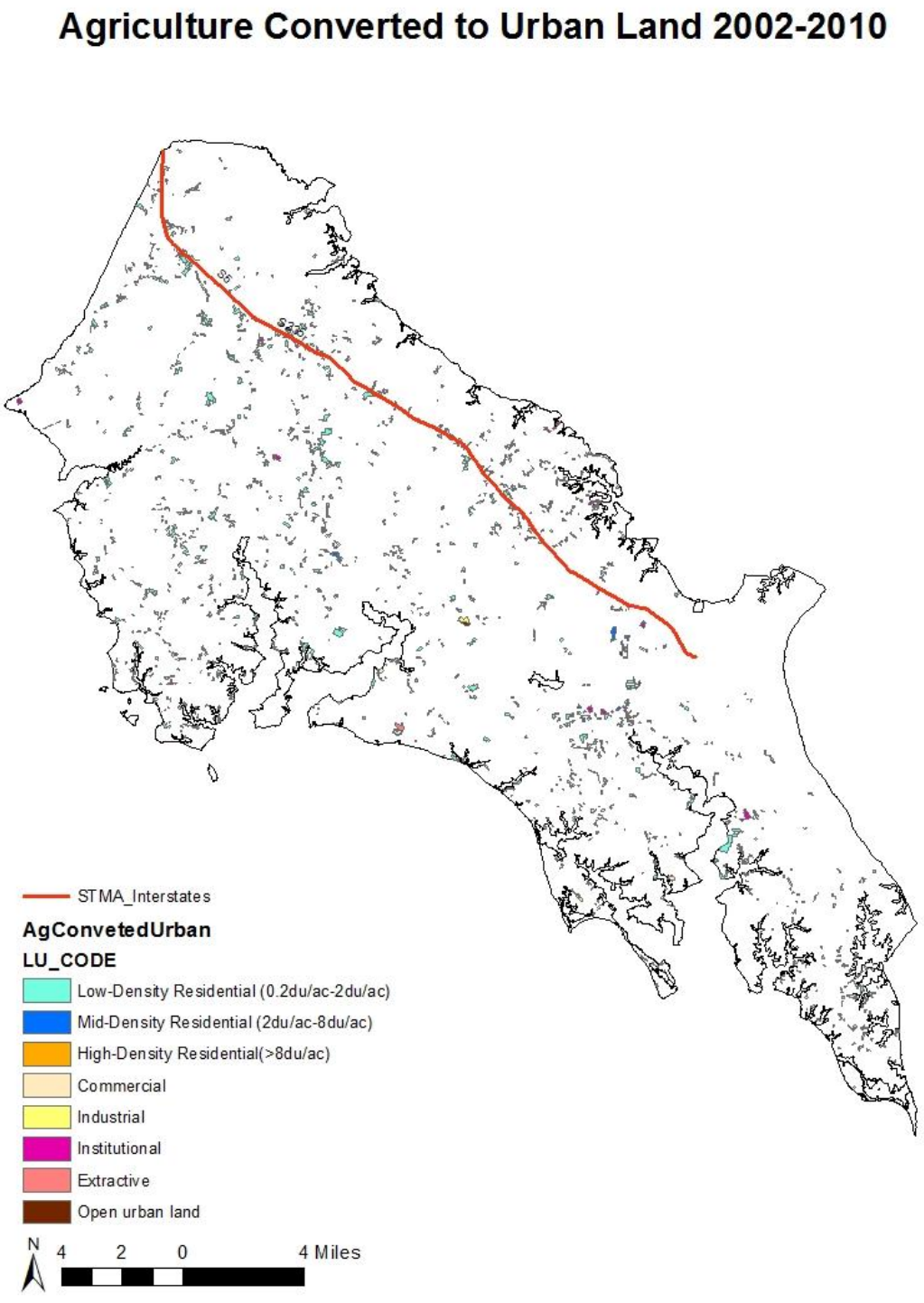
Source: MDProperty View Data, Maryland Department of Planning

Figure 10: Newly Increased Residential Land Use 2002-2010



Source: MDProperty View Data, Maryland Department of Planning

Figure 11: Agriculture Land Use Converted into Urban Land Use by Urban Use, 2002-2010



Source: MDProperty View Data, Maryland Department of Planning

Possibly Directly Impacted Agricultural Land

In both the focus group discussion and the interviews with University of Maryland extension faculty, land use conflicts between farmers and urban residential settlements were brought to the fore. To explore the reason for these conflicts we identified agricultural land parcels close enough to urban land uses to experience land use conflicts, i.e. neighborhood complaints about pesticides and fertilizer smells. We adopted a .5 mile buffer around urban land developments in both 2002 to 2010. See figure 12 and 13. Agricultural land within .5 miles of the urban land, are more directly and easily impacted by the externalities generated from the urban land development. For clarification we call these agricultural parcels possibly "Directly Impacted Agricultural Land" (hereafter as DIAL). In both 2002 and 2010, almost all of the agricultural lands are within .5 miles of urban development. The exceptions are the areas such as the red-circled ones in the figure 12 and 13 maps where farms are more than .5 miles away from urban development. The DIALs amount changes from 53,760 acres in 2002 to 48,250 acres in 2010 due to the actual decline of total agriculture lands. The proportion of DIAL land among the total agricultural lands actually increases from 89.1 % to 93.7%. The above analysis indicates that, in St. Mary's County, there is actually no specific boundary between agriculture and urban land use. The two different land use parcel types are generally proximate to each other.

As indicated before, the largest share of new urban development is low density residential units. To make a more detailed estimation of the level of newly increased DIALs in 2010 brought by the conversion process from 2002 agriculture land into 2010 urban lands, we created a .5 mile buffer for those 2002 to 2010 newly converted urban land parcels to capture the DIAL increments. In figure 14, we captured the newly increased DIAL parcels caused by the 2002 to 2010 agriculture-urban conversion process. The results turned out to be total 3,266 acres of newly increased DIALs due to the conversion process.[2] The agriculture to urban land conversion process

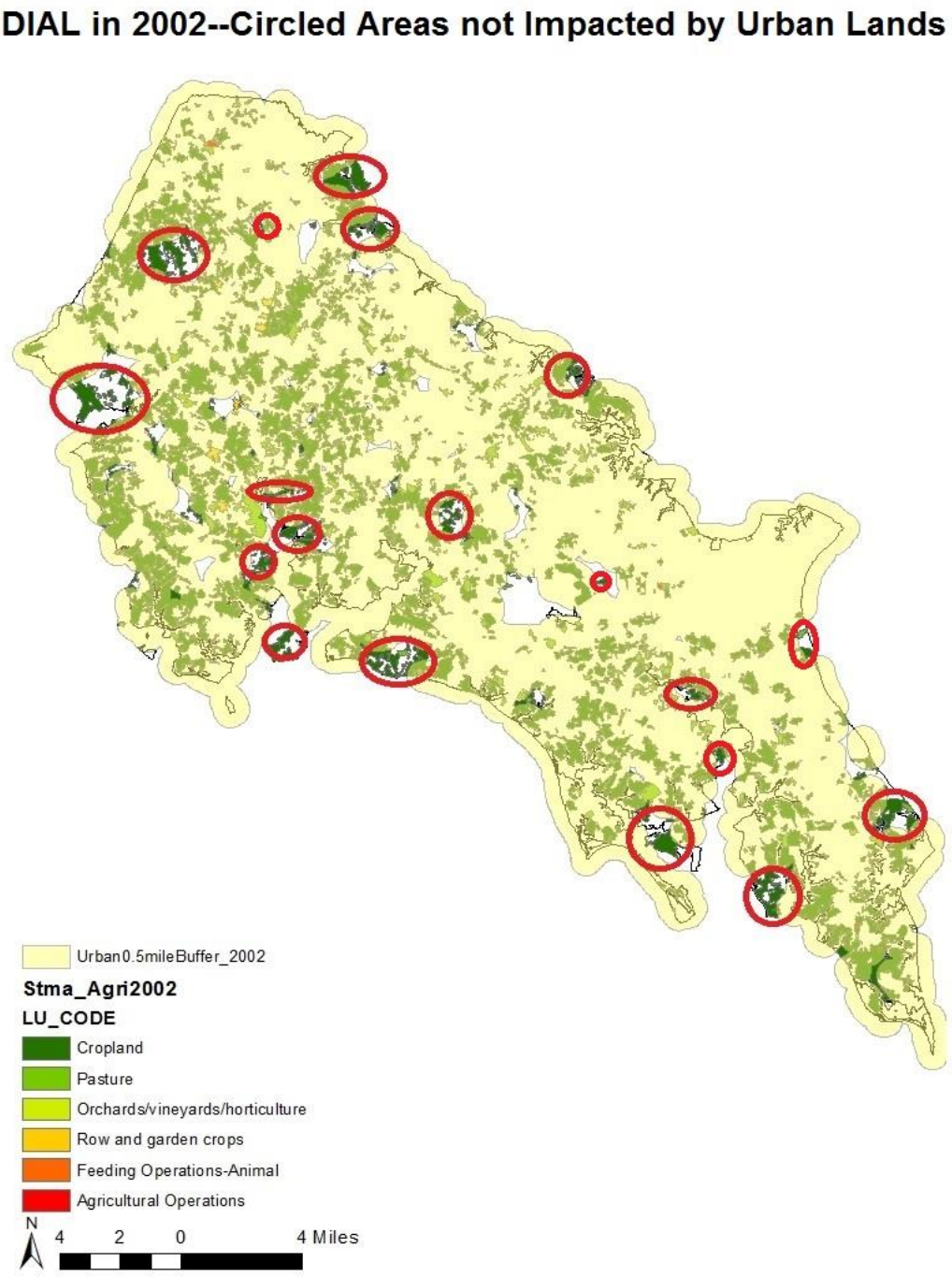
[2] The vast majority of newly affected DIALs agricultural parcels are cropland (3,026 acres) with 226 acres of

did not significantly alter the existing land use pattern. To some extent, the current land use pattern can be seen as an integration of agricultural and urban land uses, and such integration may be the reason for the on-going concern we heard in focus groups about the conflict between urban development and farming.

While by no means proof, the small increase in additional DIAL parcels is consistent with the goals of the 2007 amended TDR program: to protect and discourage urban development in the Rural Preservation District to preserve farming.

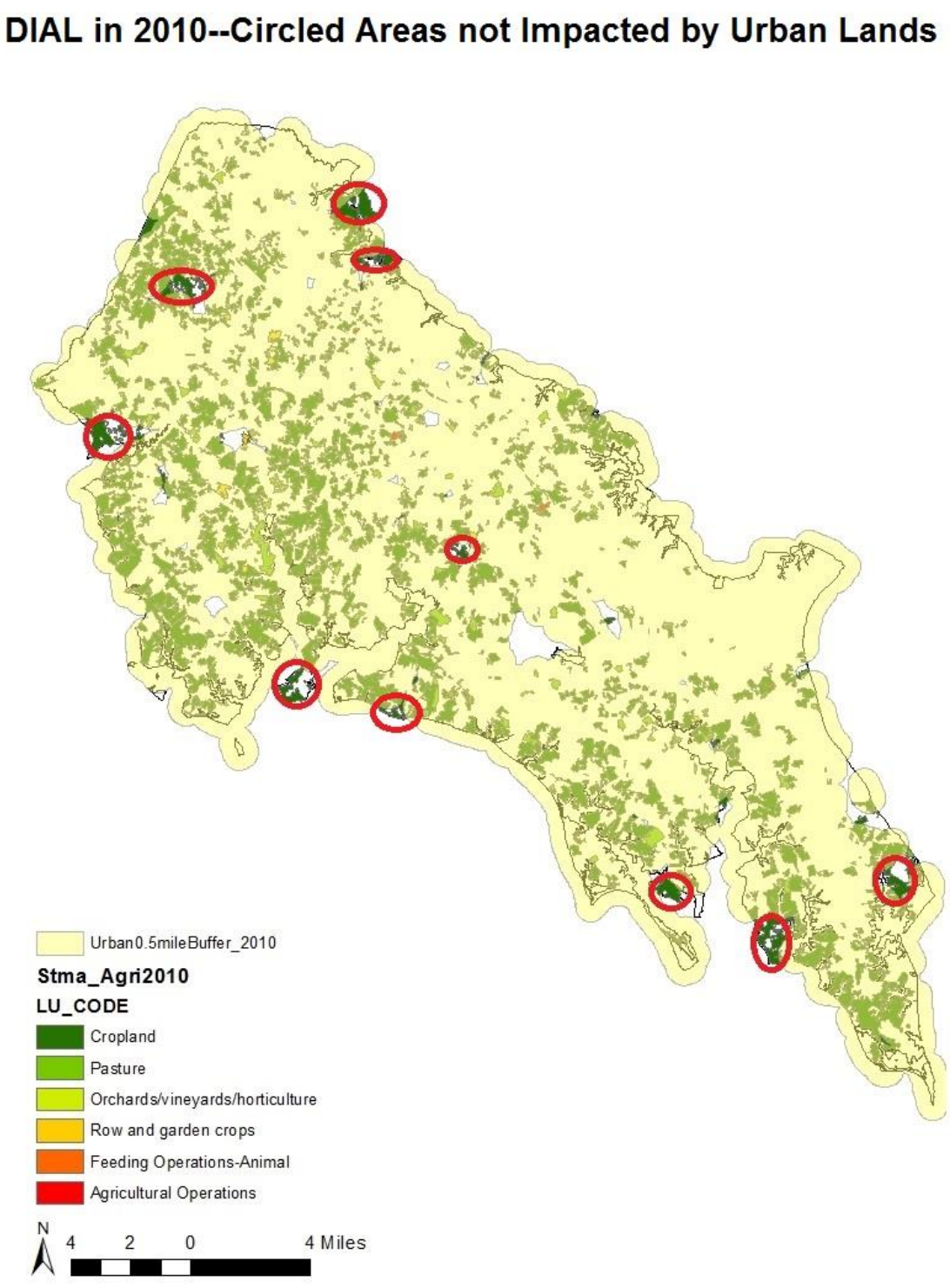
pasture and 14 acres of row and garden crops affected.

Figure 12: DIAL in 2002--Circled Areas are not impacted by urban lands



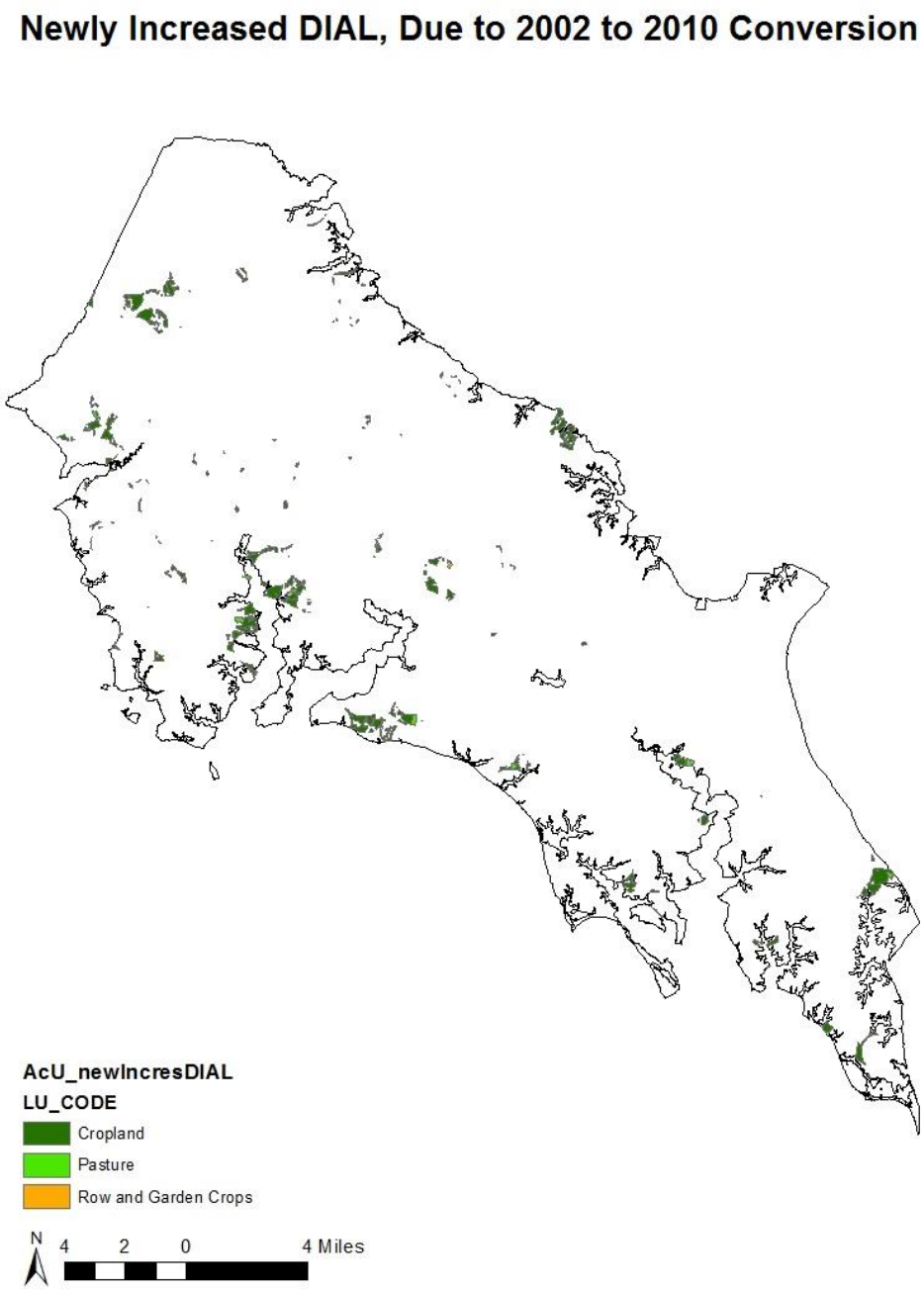
Source: MDProperty View Data, Maryland Department of Planning

Figure 13: DIAL in 2010--Circled Areas are not impacted by urban lands



Source: MDProperty View Data, Maryland Department of Planning

Figure 14: Newly Increased DIAL, Due to 2002 to 2010 Conversion



[3]

Source: MDProperty View Data, Maryland Department of Planning

Role of County's TDR Program in the Integrated Land Use Pattern

The 2007 amended TDR policy continues the pattern of integrating agriculture and urban land uses. As indicated above, the increases in urban land use is primarily low density residential development. For a TDR program to work, there has to be demand for development rights and in St. Mary's County, the demand in terms of acreage is primarily for low density residential as analyzed in the previous sections.

Transfer Development Rights separate the development rights of property from the property itself. It is a mechanism for allowing farmers to capture some of the value of their land while keeping the land in farming. Developers who purchase the development rights can add to the density or floor-area-ratio to their development elsewhere in the County. Once development rights are sold, the land will be permanently restricted from further development or preserved as open space, farmland, or woodland.[4] The base density for low density residential development is 1 dwelling per acre, which may increase to five dwellings per acre with the use of TDRs. With sufficient TDRs there would be no minimum lot size and no minimum open space required.

The lifting and landing of TDRs by land use is shown in Table 7. The majority of TDRs were purchased from forest land and the majority of TDRs were applied to urban developments, although the applications to forest areas are not far behind. Table 8 breaks the urban land uses into finer detail, including low density residential, mid-density residential, commercial, and institutional. The majority of TDRs that were used for urban land uses were used in commercial areas, 61%, and the share for low density residential was not far behind at 38%.[5]

[4] The number of Transfer Development Rights (TDRs) is determined by the number of acres, divided by 5, subtracting the number of dwellings on the property. Purchasers of TDRs may use them to increase residential density in the Rural Preservation District (RPD) or increase the floor to area ratio (FAR) in commercial zones. http://stmarysmd.com/ded/TDR.asp, 4/28/2015.

[5] These locations of TDR lifting and landings are not so precise. For example, if a parcel is 80% forested and 20% urban then the Property View data land use/land cover data designates it as forest. While the TDR landing could be on the 20% portion that is urban.

Table 7: Quantities of TDRs Lifted and Landed by Land Use. TDRs as of March 2015

Total TDRs	**Lifted**	**Landed**
Total	**1261**	**572**
TDRs Matched with 2010 MDProperty View Data*		
Total	1096	446
Agriculture	165	20
	15%	5%
Urban	169	220
	15%	49%
Forest	758	206
	69%	46%
Wetland	4	0
	.4%	0%

Note: *The total TDRS Lifted and Landed by Land use does not equal the total lifted and landed because when TDRs were matched with land use data in Property View, some TDR locations did not have matching land uses.

Source: St. Mary's County Planning Department, as of March 2015 and the 2010 MDProperty View Data from Maryland Department of Planning

Table 8: Quantities of Landed TDRs by Urban Land Use

TDRs Landed on Urban Land, No. = 220	
Low Density Residential	84
	38%
Mid Density Residential	2
	1%
Commercial	134
	61%
Institutional	0
	0%

Source: St. Mary's County Planning Department, as of March 2015 and the 2010 MDProperty View Data from Maryland Department of Planning

Mapping of the sales of, or lifting of, TDR's is spread across the county and primarily located on forest land.[6] Figure 15 shows the location of lifted TDRs till March, 2015, matched with the land use categories from 2010 Maryland Property View Data. Figure 16 shows the number of lifted TDRs, by specific location in a basic jurisdiction map of St. Mary's County. Figure 17 shows where the TDRs landed to increase development density, again matched with land uses from the 2010 Property View data. TDRs are most often purchased to increase density of forest areas, but the use of TDRs to increase urban density are also notable along Route 235 and near the Patuxent Naval Base. In several areas, TDRs were purchased to increase density on agricultural land. According to current zoning, farms and aquaculture in the rural preservation zone are permitted to use fertilizers, pesticides, and implements, even in the face of residential complaints.[7] Figure 18

[6] Matching of TDR data from the County Planning Department with the Maryland Property View 2010 land use/land cover data.

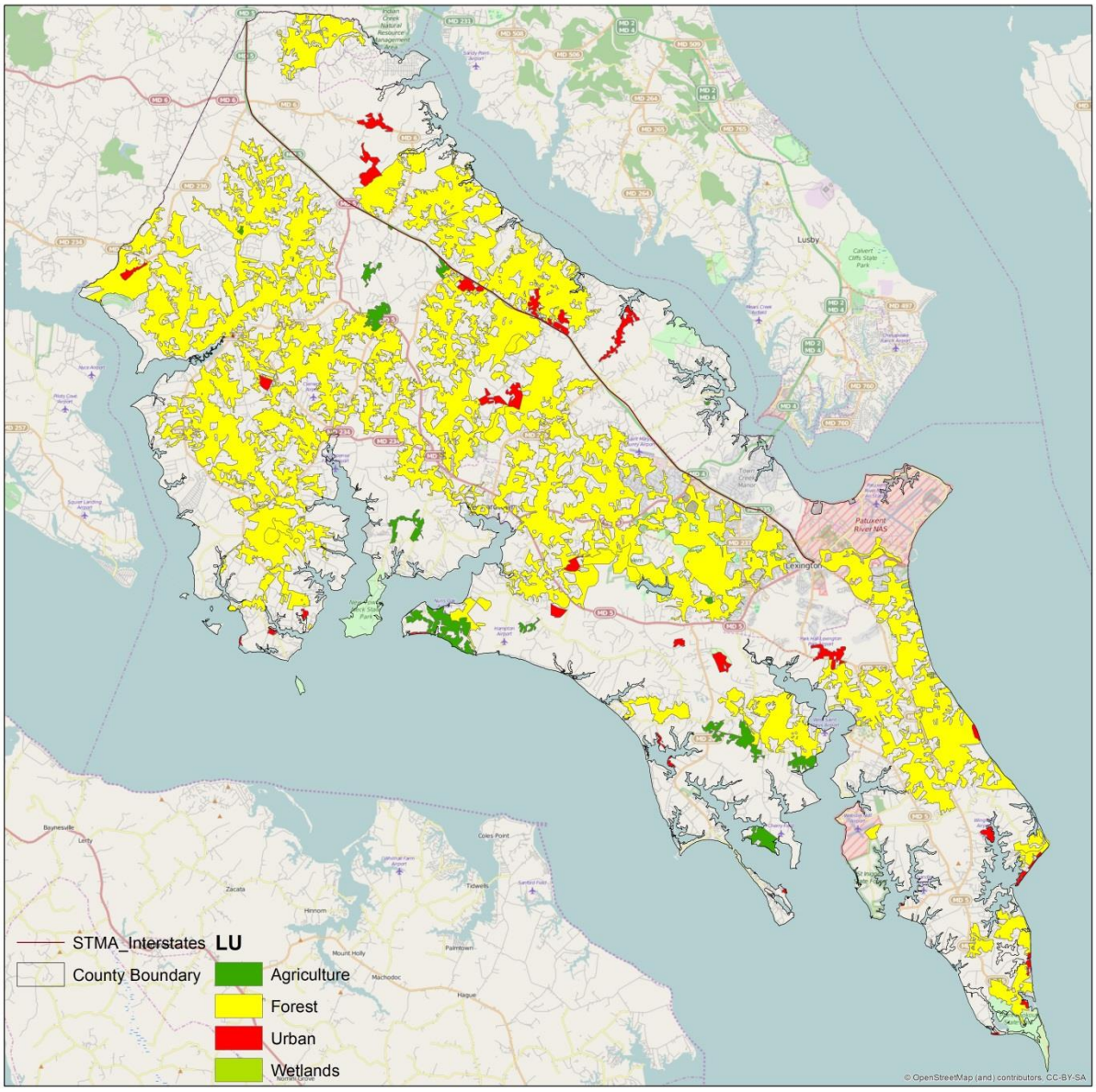
[7] According to St. Mary's County Comprehensive Zoning Ordinance, Section 53.2, (EFFECTIVE SEPTEMBER 14, 2010, last amended NOVEMBER 18, 2014), "Agriculture, aquaculture and silviculture are the preferred land uses in the rural preservation district. Agriculture, aquaculture and silviculture are also allowed in other zoning districts. The farmer has the right to farm without being restricted by neighboring residential areas. Restrictions on hours of operation of farm equipment and use of odor-producing fertilizers and mandatory noise reductions may not be imposed on the farmer in agricultural and rural preservation districts and in those districts where farming is allowed.

shows the number of landed TDRs, by specific location in a basic jurisdiction map of St. Mary's County.

Unlike more urban counties, such as Montgomery County, where a TDR program directs TDR landings to only growth areas, St. Mary's County has a pattern of landing TDRs in the rural preservation zones. This policy makes sense for St. Mary's County where demand for TDRs comes primarily from low density residential developments.

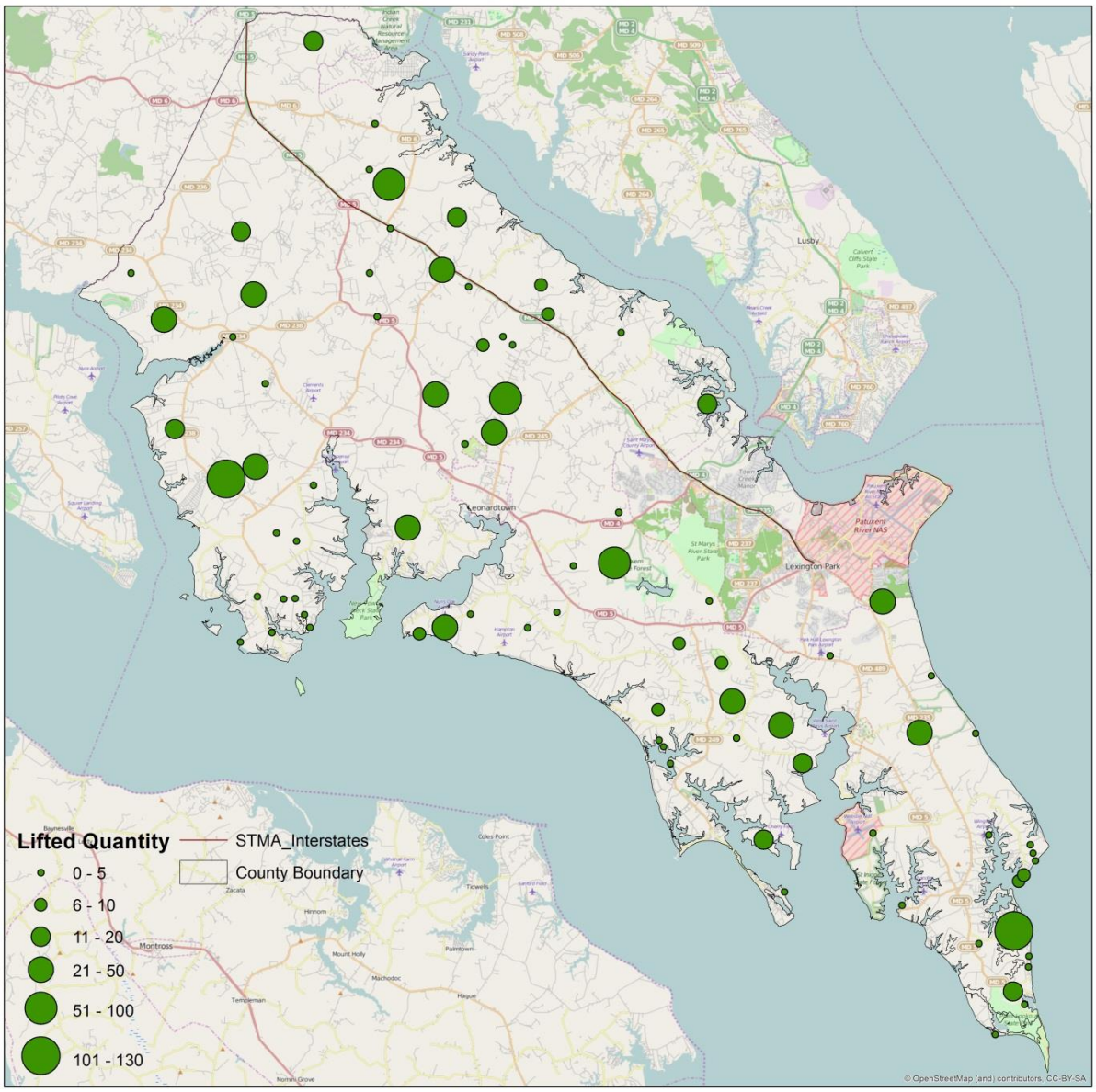
Normal agricultural activities and operations in accordance with good husbandry practices, which do not cause bodily injury or directly endanger human health, are permitted and preferred activities, including activities that may produce normal agriculturally related noise and odors.

Figure 15: Lifted TDR Parcels Matched with Property View Land Use Categories



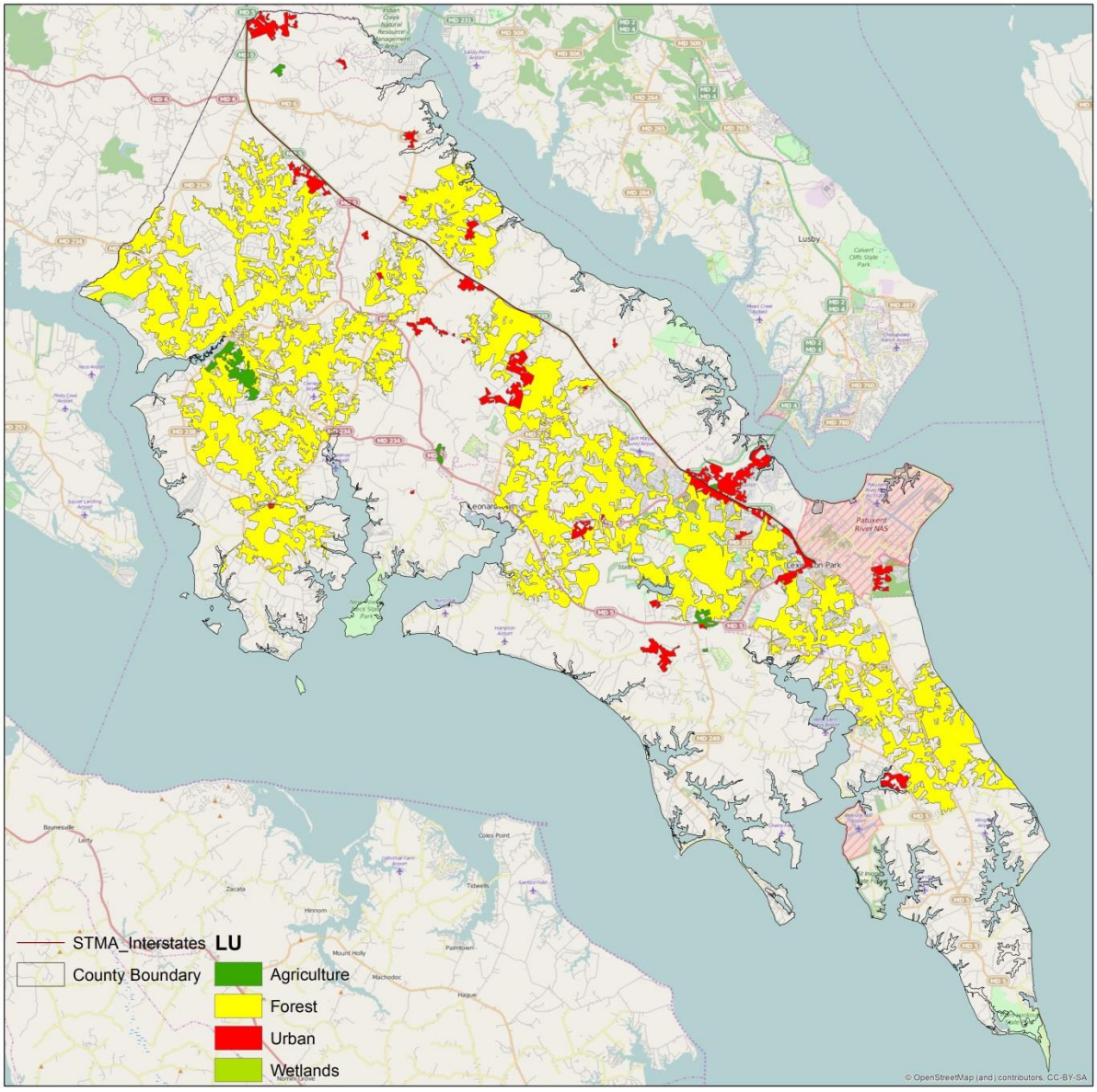
Source: MDProperty View Data, Maryland Department of Planning

Figure 16: Number of Lifted TDRs, as of March 2015.



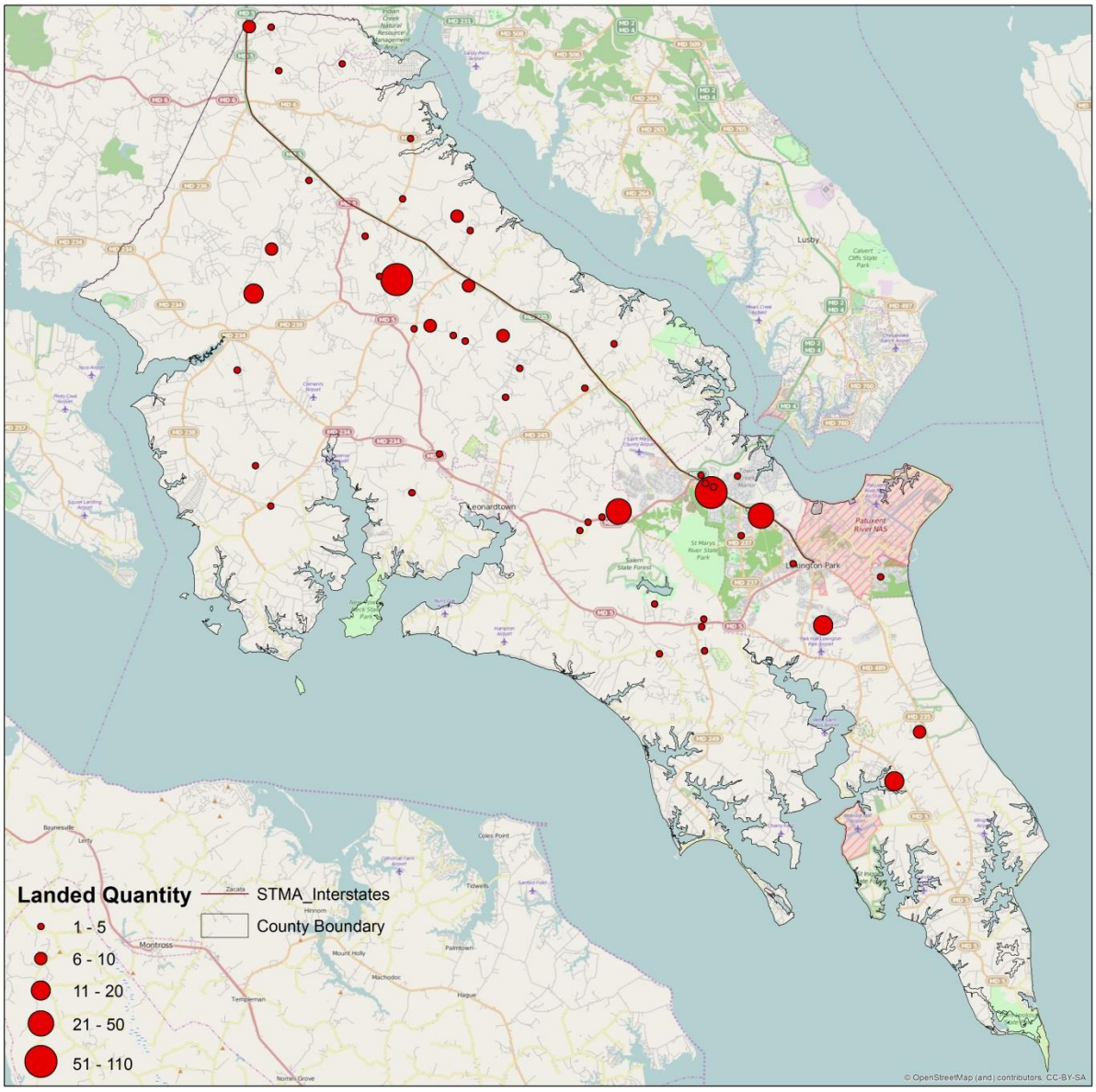
Source: MDProperty View Data, Maryland Department of Planning

Figure 17: Landed TDR Parcels Matched with Property View Land Use Categories, as of March 2015



Source: MDProperty View Data, Maryland Department of Planning

Figure 18: Number of Landed TDRs as of March 2015



Source: MDProperty View Data, Maryland Department of Planning

Recommendations for the Agricultural and Seafood Sectors in St. Mary's County

Even though agriculture and aquaculture together contributed only .43% of the County's gross domestic product in 2009[8], the preservation of the farming and seafood industries remains a top economic development priority. The importance of farming and fishing evolves from the County's scenic beauty and historical heritage. While not the major source of jobs or County income, farming and seafood remain the major share of land use and an important contributors to the County economy. See Table 4. As restated in the Comprehensive plan, the community vision is fostering economic growth while protecting the County's rural character and natural resources and historical qualities (St. Mary's County Comprehensive Plan, 2010, 3-1). Preservation of the County's rural character and stewardship of the land and environment undergird the County' current economy and future development strategy. Farming and seafood, and their supporting activities, offer a foundation for economic diversity and expansion, through such activities as horticulture, wineries, and agro-tourism. The best way to keep land and workers in the agricultural and seafood sectors is to make these sectors more profitable.

There are a number of recommendations for increasing incomes and diversity in St. Mary's farming and seafood industries, including the use of digital technology to market products into the broader regional economy and expansion into wineries, horticulture farming, agricultural tourism, and the promotion of young farmers.

Recommendation #1: Use of Digital Technology to Expand the Market for Agricultural Projects and Seafood.

Digital technology now makes it easier to connect consumers and producers. Producers can, in real time, indicate how much produce they have to sell and consumers can indicate what they are prepared to purchase. Digital technologies can connect buyers and sellers and establish the

[8] Bureau of Economic Analysis, See appendix A.

market price. A larger regional market and increased demand can drive higher market prices.

One example is Relay Foods. Relay Foods.com is a local online grocery company that serves as an intermediate platform to connect consumers and producers. They target consumers based in the Washington D.C. metropolitan area. They pick up locally produced groceries to meet consumer demand, including non GMO, local, organic, conventional foods, and they also provide other exclusive products such as in-house butchery, fresh local beef, in-house seafood, prepared food like meal-plan services to consumers.

Relay's operation process connects producers with consumers with fast and efficient "Next Day, Multi-Channel Delivery". Customers can place orders up to 12am everyday on Relay's website or mobile site. On the next day morning 6am, Relay's production and fulfillment team pick and build orders. Around 10am, Relay's truck teams arrive at warehouses at multiple locations and transfer orders to markets while van teams also collect "just-in-time" items from local vendors.

Customers can either pick up their orders at free pickup sites served by trucks, or they can receive convenient home delivery for $30/month subscription. With its own delivery fleet, Relay is currently serving the Charlottesville, VA, Richmond, VA, Washington DC, Baltimore, MD, and the Raleigh/Durham/Chapel Hill, NC areas. These markets can be broader than just markets, they can include restaurants and households.

On the producer's side, farmers and seafood producers enter their available products, including type of product, non-GMO, organic, etc. and the amount for sale. The company, then matches the supply and demand and schedules the pickups.

There are 190 producers both from the DC metropolitan area, and regional producers at MD, VA, NC areas now cooperating with Relay Foods. Farmers and producers can deliver or prepare foods for certain days of the week according to fit their own schedules. No extra burden is placed on producers to interrupt their regular farming responsibilities or schedules. There is no "middle man"

between Relay and producers which means higher margin profits than through the big box grocery stores for the producers. The new digital technology builds on the current movement to eat fresh local produce to expand the markets and incomes for St. Mary's farmers and seafood producers.

Implementation in St. Mary's County

In order to implement this new strategy, we suggest St. Mary's County host a daylong conference that invites potential transportation companies. The conference will identify pickup locations and introduce farmers and seafood producers to the digital technology that will tell the intermediary company the type of product and the quantities available. The County can help the company set up distribution hubs either through existing farmers markets or temporary warehouses on major commuting routes.

Recommendation #2: Promote young farmers.

The graying of the farm population has led to concerns about the long-term health of family farms as an American institution. Maryland already has several "young farmer" initiatives. One is the "Beginning Farmer Success" program. Beginning Farmer Success is a University of Maryland Extension partnership program providing farmers with tools and education to explore, refine, develop and implement farm businesses. The program has several initiatives. First, University of Maryland Extension educators develop a curriculum for new farmers to encourage and enhance their interest and comprehension of the field. Second, the program offers workshops that bridge the gap between exploring the career to on-farm apprenticeships and mentorship. The third objective is to expand upon existing new farmer training programs to provide practical, hands-on shoulder-to-shoulder training for beginning farmers who will work on successful farms. The program aims to ensure long-term success through continued support.

An additional effort is the Farm LINK program developed by the Southern Maryland Agricultural Development Commission. This program includes a mentoring program. Other strategies include

the offering of workshops, direct consultation, planning tools and production information to support farmers as they become established.

St. Mary's County Farm Bureau has established a sub-committee called St. Mary's County Young Farmers Organization based on a group of agricultural producers and enthusiasts between the ages of 18-35 who live in the County. In the future, we recommend the County can better utilize the existing platform of St. Mary's County Young Farmers Organization and use the resources from Beginning Farmer Success programs, to expand their partnership with related institutions such University of Maryland Extension to better represents, mobilizes, and engages young farmers to ensure their success. The County's support for younger farmers should, (1) encourage young farmers to do more sustainable farming practices that maintain healthy soil, water, air, and climate for the next generation of farmers and consumers. (2) Help beginning farmers to obtain/lease high-quality affordable land. (3) Support training for innovative farming ideas and practices and model apprenticeship education from successful and creative farmers and farming practices.

Recommendation #3: Promotion of winery tourism.

Encouragement and promotion of wineries. As part of St. Mary's economic development advertising campaign, the County should promote and advertise St. Mary's wineries and coordinate with Charles, Prince Georges, and Calvert Counties to jointly advertise winery visits. As part of this strategy, some practices can be adopted to enable the County to provide tourists with memorable experiences that keep them coming back time after time – and bringing their friends and relatives. For examples of strategies, (1) the creation of wine community partnerships. The wine regions (such as the above mentioned Charles, Prince Georges, and Calvert Counties) can work in partnership with local hotels, restaurants, airports and transportation companies to make sure that tourists have ways to find the wineries and winery tours. (2) Host special events and festivals, think "out of the box" in developing unique events. (3) Create unique winery tours for winery visitors,

such as Wine Village that is designed specifically around the theme of wine. Restaurants in the village cater to visitors with food that matches local wines. Hotels offer rooms and packages designed around a wine theme. (4) Link winery tourism to regional tourism, such as other local tourism sites.

Recommendation #4: Promote horticulture.

With the residential growth in the surrounding counties of Charles, Prince Georges, and Calvert counties, there is an expanding horticulture market, including landscaping plants and lawns. St. Mary's farmers might be helped to move into these markets at the same time advertising promotes St. Mary's products.

Recommendation #5: Promote heritage tourism.

Proximity to the metropolitan areas of Washington, D.C. and Baltimore and the rich array of historical sites offers potential for agricultural and heritage tourism in the County. Heritage tourism, through which visitors seek a historic or educational experience can be a rapidly expanding sector for the County's travel industry. Additional bed and breakfast and restaurant options in the County are needed to expand this sector. Internet can also be used to promote heritage tourism. The internet itineraries can further the public's understanding and appreciation of the historic places and to help preserve these irreplaceable resources, especially they can help publicize less-visited historic sites by linking them with better-known places in the County.

Recommendation #6: Promotion of Agricultural and Seafood Tourism

The County could promote St Mary's agricultural and seafood tourism by advertising the opportunities in St. Mary's County to visit farms, "pick your own" produce, and visit the waterman and seafood lifestyle. This involves the County undertaking an advertising campaign in the metro Washington, D.C. and Baltimore regions.

Summary

Although farming incomes have rebounded in the past five years, the income per acre of farmland in St. Mary's County does not generate the same revenue as does the rest of the State of Maryland. Increasing farm incomes is a high priority. The County and the University of Maryland already have efforts in the areas of advertising, promoting tourism, and young farmer programs. The University of Maryland extension service is tackling encouragement of the development of new markets, pest control, environmental protection, and the encouragement of young farmers (interviews with Hanson (2015), Takacs (2015), Everts, (2015). We are merely reiterating that the County should continue and expand the promotion of these initiatives.

We see the main areas for maintaining the rural lifestyle is to increase farming and aquaculture incomes and to do this through the adoption of digital technology linking transportation networks to broader and larger markets for St. Mary's agricultural and seafood products. Around the country, digital technology is being used to expand markets by connecting producers with customers in real time. Consumers include markets, restaurants, and households. Consumers' increasing demand for fresh produce is creating substantial market possibilities for St. Mary's products and higher income opportunities for St. Mary's farmers. The digital technology in combination with County sponsored advertising campaigns to visit St. Mary's County and "buy St. Mary's" products is a way the County government can increase farm incomes and strengthen the seafood and agricultural sector.

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Appendix A: Gross Domestic Product of Agriculture, Farming, and Fishing in St. Mary's County and Maryland, 2001 to 2013

	Agriculture, forestry, fishing, and hunting (share of total GDP)	Farms (share of total GDP)	Forestry, fishing, and related activities (share of total GDP)	Agriculture, forestry, fishing, and hunting (share of total GDP)	Farms (share of total GDP)	Forestry, fishing, and related activities (share of total GDP)
	St. Mary's County			Maryland		
2001	**0.65%**	**0.52%**	**0.13%**	**0.35%**	**0.30%**	**0.05%**
2002	**0.12%**		**0.12%**	**0.25%**	**0.20%**	**0.05%**
2003		**0.30%**		**0.29%**	**0.23%**	**0.05%**
2004	**0.46%**	**0.36%**	**0.13%**	**0.35%**	**0.30%**	**0.05%**
2005	**0.32%**	**0.22%**	**0.10%**	**0.30%**	**0.25%**	**0.05%**
2006	**0.25%**	**0.16%**	**0.09%**	**0.28%**	**0.23%**	**0.05%**
2007	**0.21%**	**0.11%**	**0.09%**	**0.26%**	**0.22%**	**0.04%**
2008	**0.42%**	**0.31%**	**0.10%**	**0.26%**	**0.21%**	**0.04%**
2009	**0.43%**	**0.36%**	**0.08%**	**0.27%**	**0.23%**	**0.04%**
2010	**(na)**	**0.26%**	(na)	**0.26%**	**0.22%**	**0.04%**
2011	(na)	**0.43%**	(na)	**0.31%**	**0.27%**	**0.04%**
2012	(na)	**0.36%**	(na)	**0.33%**	**0.29%**	**0.04%**
2013	(na)	**(na)**	(na)	**0.46%**	**(na)**	**(na)**

Source: Bureau of Economic Analysis, The BEA measures St. Mary's County with the same boundaries as the California-Lexington Park, MD (Metropolitan Statistical Area) reported in the BEA data.