

REPORT

DOWNZONING: DOES IT PROTECT WORKING LANDSCAPES AND MAINTAIN EQUITY FOR THE LANDOWNER?

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PREFACE

Recent forecasts indicate that an additional three million people are expected to settle in the Chesapeake Bay watershed by 2020. Given the strong connection between the health of the Chesapeake and land use, and the significant additional development projected based on population estimates, it is clear that enhancing, or even maintaining the health of the Chesapeake Bay will involve difficult choices in how we manage growth. The new Chesapeake 2000 Bay Agreement reflects a heightened concern with this issue and includes a section “Sound Land Use” containing 26 distinct land use goals. The most controversial of these goals, and the most important to the future of the Bay is this commitment: “ By 2012, reduce the rate of harmful sprawl development on forest and agricultural land in the Chesapeake Bay watershed by 30 percent.”

Maryland faces a tremendous challenge in meeting this sprawl reduction commitment, even with smart growth leadership from Maryland State government and progressive local plans. This difficulty is exacerbated by a strong concern for private property rights and the need of landowners to maintain equity in their land for farming and financial planning purposes.

One policy tool often used to curb sprawl is that of “downzoning” which reduces the development potential on agricultural or conservation lands. Research shows that this tool has worked well to combat sprawl in the Baltimore region, and other areas of the country have also experienced similar benefits from this type of zoning. Other techniques like transferable development rights are proven for protecting targeted resource areas, especially when applied along with low density agricultural zonings as was done in Montgomery County, Maryland. The result is not a patchwork pattern that can leave protected areas vulnerable to intermixed sprawl.

Key to the establishment and implementation of meaningful downzoning is an understanding of the effect of such downzoning on the value of rural lands as well as its effect on property rights under the “Takings Clause” of the Constitution. More important is ensuring the fairness of any such actions; that the benefits and burdens are balanced among all segments of the population.

The purpose of this report is to determine what effect if any, downzoning has on rural land values in the mid and upper Eastern Shore and in Southern Maryland. It is intended that the report provide an indication as to how property values have been affected by past downzoning. It is hoped that the results will be useful to planning officials, county commissioners and council members in Maryland as well as to State officials.

EXECUTIVE SUMMARY

Downzoning is the practice of initiating a new zone and regulation, or changing it so that densities or standards previously allowed on property are changed to further restrict the use of the property. Downzoning usually occurs during a comprehensive rezoning process conducted by the appropriate county agency. It can also occur to a specific property at the request of the owner of that property.

This study was initiated because of the controversy that surrounds a downzoning action. In sum, landowners are concerned that if their property is the subject of a downzoning, the property will be de-valued and the equity that they had built up in the property will be diminished or lost. This study took a three-fold approach to find out whether downzoning maintained equity, particularly for rural and agriculturally zoned land. The first part of the approach was to conduct a national literature search of downzoning examples to ascertain whether there was a pattern of equity retention or loss of value or both. The second part of the approach was extensive use of interviews. Local county planning and zoning offices of Anne Arundel, Baltimore, Calvert, Caroline, Cecil, Charles, Dorchester, Kent, Montgomery, Queen Anne's and Talbot were interviewed as to the specific programs they had in place. Members of the agricultural community were interviewed as to their personal experience and opinion with downzoning. And, three former Secretaries of the Department of Agriculture were all interviewed as to their State- wide perspective on downzoning. The third part of the approach involved rigorous statistical analysis in which study counties (those that had downzoned) were paired with control counties (those that had not downzoned). The study counties were Dorchester, Kent, Calvert and Talbot. The control counties with which the study counties were paired were Somerset, Queen Anne's, Charles and Queen Anne's respectively. Land transactions and the acreage value within each county reflecting the time period before and after the downzoning were examined and recorded. The pairing allowed for a comparison of land value to be made between the counties both with respect to land value before the downzoning and with respect to land values after the downzoning.

The results from the statistical analysis, the interviews, and the literature search were complementary:

Results from the Statistic Analysis:

- 1) The general opinion that downzoning will diminish agricultural land values does not seem supported by the experience of four Eastern Shore and Southern Maryland counties that have downzoned agricultural lands.
- 2) When study counties were paired with control counties, the result of downzoning was either higher land value for the downzoned counties or little to no appreciable effect on their land value.

Results from the Literature Search:

- 1) Conventional wisdom that zoning has a uniformly negative effect on land prices is untrue. It is also untrue that downzoning has a uniformly positive or neutral effect on prices in all cases. There are many factors that influence value such as a robust economy at the local, state, regional and national level; the suitability of the land for alternative “developed” uses, for agriculture or rural use; where the land is located and how accessible it is to transportation, water and sewer, good schools etc.; whether the land is located close to growth pressure etc.
- 2) Contrary to popular perception, downzoning ordinances enacted as part of a comprehensive planning process have demonstrated that they have supported or stabilized land values, and have preserved land for long periods of time.

Insights from the Interviews:

- 1) Downzoning works best when it is implemented as part of a comprehensive plan and when the county has initially identified the key agricultural and rural lands it wants to protect for economic and/or for valued natural resource reasons.
- 2) If downzoning is used to protect agricultural land, forestland and open space, it should be established with very few opportunities that create exceptions to the overall density to be attained. In other words, intra-family transfers and the creation of extra lots should be implemented in as conservative manner as possible otherwise the purpose for which downzoning was enacted will not be attained.
- 3) Tools such as transferable development rights, purchase of development rights, installment purchase agreements, and tax credits should be viewed as possible complements to downzoning that can create opportunity and equity options for landowners whose land has been downzoned.
- 4) When downzoning is employed as an integral part of a comprehensive approach to farmland protection, it is a critical and indispensable component to the success of that effort. (Verbal remark from Dr. Royce Hanson, Chairman of the Board of Directors for the Maryland Environmental Trust).

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CHAPTER I. Introduction

When the word “downzoning” is mentioned among a group of landowners or at a local government planning and zoning meeting, concern is usually expressed about the loss of value of one’s property. While it is generally acknowledged that downzoning can be an effective tool to preserve working landscapes and natural resource-based open spaces, not everyone agrees that it is a tool that creates fairness among landowners. Farmers in particular are very concerned because even though they want to be able to continue to farm, at some point a farmer also wants to be able to sell off a portion of or the entire acreage of the property to provide financial help during rough times, or for retirement. “Downzoning” oftentimes becomes equated with “devaluation” of the land and hence a lost economic opportunity for the farmer.

A. A Few Words About Downzoning

Downzoning refers to a practice of initiating and establishing a new zone and regulation, or amending a zoning map so that densities or standards previously allowed on property are changed to further restrict the use of the property.¹ It is a legally binding designation of the uses to which land may be put including the type, amount, and location of development.² Downzoning of multiple properties, which usually takes place during the comprehensive planning process, can only occur at the initiative of local government, although that initiative may be prompted by demands from interest groups. Downzoning can also occur through the initiative of an individual landowner, but only of his/her property. The focus of this Report is on the downzoning of agricultural and rural zoned lands with respect to residential development.

Is this something new? No, not really. In fact, downzoning has taken many forms across our country’s terrain (e.g., large lot zoning, fixed-areas based zoning, sliding scale zoning, etc.). What is important to know is that downzoning itself, or together with other tools (i.e., transfer of development rights, purchase of development rights, clustering, etc.) has been relied upon to maintain the acreage of rural lands, to maintain the value that they represent, and used as an overall growth management tool to help concentrate development around existing infrastructure, schools and roads.

B. Approach and Methodology

The Boards of the Eastern Shore Land Conservancy and the Maryland Center for Agro-Ecology, Inc. expressed an interest in two particular areas of Maryland’s predominantly rural counties: the middle and upper Eastern Shore (Cecil, Kent, Caroline, Queen Anne’s, Dorchester, Talbot) and Southern Western Shore (Calvert, Charles, St. Mary’s) for the downzoning assessment. Not only were these areas identified as experiencing development pressure, but also several counties within these study areas had implemented downzoning to address this pressure, and the effectiveness of downzoning

¹ Dr. Royce Hanson. Written Notes provided for this report. October 2003.

² Robert Gray. Robert J. Gray & Associates. Verbal Comment provided on November 1, 2003.

as a preservation and equity maintaining tool had not been assessed. Furthermore, interest in the “success” of downzoning has increased not only in Western Maryland but also with townships and counties in the mid-Atlantic region.

Maryland in general has an active and fluid market in land with numerous firms and a comprehensive real estate listing service (Property View) providing information on sales and purchases of farm parcels. To assess the effect of downzoning on the value of property, a three-pronged approach was used. First, a literature search was conducted to uncover reports and empirical studies that would analyze whether downzoning had a universal negative effect on land value. The review included direct searches of the Internet, searches requested from the Library of Congress and from university sources. Of surprise to the investigative team was that very few studies were found. Of those that were uncovered, there was not uniform support for the conclusion that downzoning had a consistently negative impact on land values.

The second approach involved personal interviews with planning directors and/or their staffs from the mid to upper Eastern Shore counties as well as the three counties comprising the Southern Western Shore. The local government interview process was extended to three additional counties namely Anne Arundel, Baltimore and Montgomery. Personal perspectives were also sought from members of the farming community as well as the present and former secretaries of Maryland’s Department of Agriculture to seek their knowledge about and experience with downzoning in their county or other areas across the State. As can be expected, opinions and experience were mixed but all were open to seeing the results of this present effort.

The third approach, the statistical analysis, was conducted to assess two comparisons. In one comparison, a chronological study was conducted of land value in agricultural/rural areas that had been downzoned. A number of the counties in the area to be studied had instituted forms of downzoning, some within the last few years. Among those were Dorchester, Caroline, Talbot, Calvert and Kent. This phase examined the effect of these downzonings on land value in the affected areas during the years immediately before and after the zoning change. The second comparison of the study assessed the trend in land value in a county that implemented downzoning relative to the trend in land value of a neighboring county that had not downzoned.

The statistical analysis implemented a “chronological” or “before/after” downzoning comparison at the same time as the downzoned vs. control comparison. The comparisons involved the following:

- Ascertaining which counties made significant changes in agricultural zoning in the recent past.
- Obtaining comprehensive zoning maps and ordinances from the selected counties.
- Ascertaining the adequacy of data sources from the selected counties.
(NOTE: While data from some counties appeared to be well represented in the central Property View database maintained by the Maryland

Department of Planning, information from other areas were only available from tax map indexes such as SpecPrint, Inc., or from real estate services such as the Lusk Reports).

- Collecting the data, which involved computer analysis of existing databases, or manual collection of data from reports of property transfers.
- Creating data sets allowing one to control for chronological trends in land value, such as an increase or decrease in general desirability of land prices over time, and for the “present day” comparison; developing a control group to correct for the confounding effects of geographical location, accessibility, proximity to shopping, schools, etc.
- Assuring the validity of the samples.
- Entering the collected data into a master database and analyzing to detect trends in land value related to key variables such as zoning, parcel size and market price.

The remaining chapters of the report present the literature review, downzoning for selected Maryland counties, the statistical analysis of the Maryland data, and finally, findings and conclusions.

CHAPTER II: The Rural Landscape – A National Glimpse

A. Status and Trends

The total land base for the United States is 2.1 billion acres. Of that total, 1.4 billion acres are in non-federal ownership consisting of state, local government and privately owned rural lands representing 93%; the largest segment of this Country's land base and 700 million acres are owned by the Federal government.³ Rural lands run the gamut from intensely farmed cropland to less intense uses such as forestland, pasture, and lands that are in transition from agricultural to brush land and to wooded area. Unfortunately, these lands have been given a low priority over the years in land use planning and zoning ordinances. In many local and/or state land use plans across the nation, they are often grouped in the category of "other lands" or "undeveloped land" as opposed to residential, commercial and industrial. The transformation of these lands to other uses has been staggering.

Every five years the U.S. Department of Agriculture's Natural Resource Conservation Service conducts an inventory on non-federal rural lands as well as the extent of urbanized areas. Data from the most recent National Resource Inventory show that the United States was comprised of 410 million acres of cropland, 407 million acres of forestland, 406 million acres of rangeland, 120 million acres of pasture-land and another 51 million acres of "other rural lands" including farmsteads and related uses.⁴ Ninety-eight million acres were noted as being urbanized. This developed land has been increasing at a rate of 2.2 million acres annually nationwide.⁵

Rural lands contribute significantly to open space enjoyment and vision, tourism, recreational activity, wildlife habitat, water quality and agricultural and forestry production. When taken together, its worth is incalculable. When taken separately however, one finds that the agricultural portion produced \$196 billion in commodities in 1997, translating into more than \$1 trillion in total value added of food and fiber products generated by the production of livestock and crops.⁶ Private forestlands produced more than \$25 billion in forestry products. The future of our rural lands is of inestimable importance to our states and local governments. Once those lands become developed, they do not revert back to their prior value and character.

Over the past four decades, urban sprawl has been at work eroding the nation's rural land base. As metropolitan areas grew in a haphazard manner causing highway congestion, air pollution, and other environmental concerns, people and jobs drew away from the inner cities. This eroded the tax base and further weakened the schools and other public facilities necessary for healthy communities. Unfettered growth that occurred around many of the nation's metropolitan areas in the 1960's, created a wave of new state and

³ Natural Resources Conservation Service. National Resources Inventory. Summary Report. 1997.

⁴ Ibid.

⁵ Ibid.

⁶ U.S. Bureau of the Census. Census of Agriculture. 1997.

local government policies and programs aimed at curbing sprawl. The perceived negative consequences to the environment, the economy, and the social fabric of metropolitan areas were the key forces behind the change.

B. Comprehensive Management Approaches

During the 1970s, the term “growth management” came into vogue. The term implied a combined set of state and/or local government policies and programs that would control the rate, timing and location of urban growth. Those policies and programs were incentive-based as well as regulatory in nature, with a combination of both sometimes being used.

Among the most comprehensive of programs was that of Oregon. Under its Land Use Act of 1973⁷, a Land Conservation and Development Commission was created and charged with developing statewide planning goals and guidelines for use by state agencies, cities and counties in preparing, adopting, revising, and implementing existing and future comprehensive land use plans.⁸ To meet the goal of an orderly and efficient transition from rural to urban land use, growth boundaries were established to separate urban from rural.

Other states enacted policies and programs that were more targeted in nature. California passed the Coastal Act of 1976 to protect its 1,000 mile long coastline.⁹ The Act created a State Coastal Commission to review and approve or veto development proposals in the adjoining 1,000-yard wide strip of land along the coast.¹⁰ Vermont passed the Environmental Control Act in 1970 (referred to as Act 250), which set up a planning process and permit system to screen subdivision and development proposals affecting 10 acres or more.¹¹ In 1984, Maryland passed the Chesapeake Bay Critical Area Act, establishing a Commission to develop criteria that would be incorporated into local government developed critical area programs, implemented by them with Commission oversight. How and where development was to occur focused on a 1000-foot wide strip of land along Maryland’s tidal waters.

C. Rural Land Management Approaches

During this time, rural zoning techniques were also explored to protect the land base from scattered leapfrog development with dwelling units occupying one, two or three acre parcels.

The purposes for this type of zoning were to:

⁷ Oregon Land Conservation and Development Commission. “Statewide Planning Goals and Guidelines”. January 1, 1975.

⁸ Ibid.

⁹ California Public Resources Code, Section 300051.

¹⁰ Ibid.

¹¹ Vermont Statutes Annotated. Title 10, Sections 6000-6091.

- Reduce public service costs and other infrastructure expenses.
- Save environmentally sensitive and unique lands.
- Preserve woodlands and other related open space.
- Save agricultural land and maintain the local community agricultural economic base.
- Avoid conflicts between non-farm rural residents and farming operations.

Although many of the early zoning ordinances were initiated to protect agricultural land, the overall goals were much broader as indicated above.

Rural zoning ordinances vary in their approach, techniques, and in the densities of non-farm dwelling units allowed. The basic types are:

- Exclusive Agricultural Zoning
- Non-exclusive Agricultural Zoning
 - Large Minimum Lot Size
 - Fixed Area-Based Allocation
 - Sliding Scale Area-Based Allocation

All of these in one form or another seek to limit the number of dwelling units in rural areas. All of these are in some form an example of downzoning.

1. Exclusive Agricultural Zoning

This form of zoning prohibits all non-farm development in a designated agricultural area. Napa County, California implemented this technique in the 1970's to preserve its highly productive vineyards. Santa Cruz County, California used this form of zoning to preserve its rich farmland. A local government must first designate an area to be kept in agricultural production denoting that the area is both a viable one and an important natural resource to protect. If strictly followed, this form of zoning tends to eliminate the speculative value of farmland, keeping land prices close to production value.

2. Non-Exclusive Agricultural Zoning

Large Minimum Lot Size

Ordinances promoting this form of rural land protection require a substantial minimum lot size ranging from 20 acres to as much as 640 acres for a single family dwelling. The purpose is to limit the number of dwelling units on rural lands.¹²

Large Lot zoning will keep blocks of land open and free from scattered development and prevent the parceling of land into one, two or three acre lots. Large lot zoning also defines the economic use of the land by its density provisions. An example of this form

¹² National Agricultural land Study. The Protection of Farms: A Reference Guidebook for State and Local Governments. Chapter 6. 1981.

of zoning occurred in the Brandywine area of Pennsylvania on 17,000 acres owned by the King Ranch. When the Black Angus industry no longer produced a profit, the owners requested the local government to approve zoning at a density of 1 dwelling unit (du) per 100 acres. The owners then placed a minimum sales price of \$1 million per 100 acres if the acreage was to be purchased for a home site. To date, this has ostensibly kept the acreage intact for agricultural activities.

Fixed Area-Based Allocation

This approach, which has been used in a number of rural townships and counties in the Northeast, allows dwelling units to be built on relatively small lots, one acre to one-half acre or less. The lots can be clustered on one part of a farm or rural acreage. An example of fixed area-base allocation is allowing one residential dwelling unit on each quarter of 160 acres, or one unit for every 40 acres.

An analysis of townships in Dakota County, Minnesota performed by Resource Management Consultants in 1999 demonstrates the effectiveness of this approach to rural zoning.¹³ The rural townships in Dakota County located south of Minneapolis-St. Paul were allowed one residential dwelling unit on each quarter of a 160-acre parcel, or one dwelling unit per 40 acres. The residential units were clustered on small lots within the 160-acre parcel,¹⁴ with the remaining portion of the parcel kept in agricultural use. From 1975 through 1997, this zoning approach worked effectively in the 13 townships of Dakota County. Less than 100 dwelling units had been constructed, well within the allowable range under the fixed area-based allocation ordinance.

Fixed area-based allocation zoning allows for the clustering of dwelling units on small parcels of less than one acre, leaving the remainder of land to be available for rural economic use. The individual residential lots are severed from the rest of the parcel allowing the owner to continue to use it for agricultural or forestry use. To be effective, lots should have a maximum size restriction, the smaller the maximum lot size, the more effective this kind of zoning will be in preserving farmland.¹⁵ As an example, a 100 acre farm parcel that develops under a fixed area-based zoning ordinance that allows one development right per 20 acres would yield an end result of 100 acres developed with 0 acres remaining for agriculture. If that same acreage were developed with a maximum lot size of 10 acres, the end result would be five 10-acre lots with one 50-acre lot, though still not enough for farming. If that same farm was developed with a maximum lot size of two acres, it would likely result in five 2-acre residential lots with one 90-acre lot to stay in farming.

¹³ Resource Management Consultants. Evaluation of Minnesota Agricultural land Preservation Program. Prepared for the Minnesota Department of Agriculture. June 1999.

¹⁴ Ibid., Section IV. June 1999.

¹⁵ Robert E. Coughlin. "Formulating and Evaluating Agricultural Zoning Programs." Journal of the American Planning Association. Vol. 57, No. 2, pgs. 183-192. 1991.

Sliding Scale Zoning

This is another area-based, non-exclusive agricultural zoning tool. Instead of using a set acreage as in fixed area-based zoning, the acreage required per development right with sliding scale zoning depends on the size of the tract. As the farmland tract increases, the density of developable lots decreases.¹⁶ This method is based on the premise that smaller acreage tracts are less useful for agriculture and if development is to occur, it should occur on tracts that are less critical for agriculture.

Effectiveness can only be maintained if: 1) an ordinance of this type is developed with a high average acre requirement per development right, 2) if the local government in charge of implementing the ordinance can prevent rural estates and, 3) if the designers of the ordinance can do a good job predicting the average number of tracts which comprise the various farm sizes. Montgomery County and Clarke County, Virginia are examples.

D. The Equity Concern – What Does The Literature Search Show?

Downzoning has not been and is not now without controversy concerning its effect on agricultural/rural land values.¹⁷ The conventional wisdom is that strict agricultural zoning will reduce agricultural land values since potentially more lucrative alternative uses for land will be eliminated. Is that necessarily the case?

In 1990, David M. Henneberry and Richard Barrows wrote a research paper titled: Capitalization of Exclusive Agricultural Zoning in Farmland Prices (Land Use Controls). In this empirical study, the price effect of exclusive agricultural zoning was examined by analyzing 140 parcels of farmland that were sold in 1980 and 1981 in Rock County, Wisconsin.

The authors began by pointing out that most of the research on the potential negative and positive price effects of zoning had pertained to studies focusing on urban settings. For the agricultural setting, previous research had assumed that zoning had an identical (negative) effect on all parcels. However, instead of making this assumption, they tested their own hypothesis that the price effect of Exclusive Agricultural Zoning varied with parcel characteristics.

After empirical analysis of the local situation, the authors were able to support their hypothesis, with their results showing that Exclusive Agricultural Zoning had both positive and negative price effects and that these price effects applied differently depending on parcel characteristics. Positive price effects were found for large farmland parcels somewhat removed from urban areas and for parcels without much development

¹⁶ Thomas L. Daniels and Deborah Bowers. Holding Our Ground: Protecting America's Farms and Farmland. Island Press. Washington, D.C. 1997.

¹⁷ Maryland Department of Planning. Managing Maryland's Growth Issue Paper: The Potential for New Residential Development in Maryland. www.mdp.state.md.us/planning

potential. Smaller agricultural parcels relatively close to urban areas sold for a higher price if not zoned, indicating a negative capitalization effect.

The authors also elaborated on the political context of their study. In Rock County, rural township government is controlled by farmers and zoning is adopted only with strong farm support. To insist that strict agricultural zoning must inevitably decrease land values was to the authors equivalent to arguing either that farmland owners vote themselves a capital loss or that farmers are ignorant of zoning effects in spite of considerable local experience. The authors concluded that economists should recognize that zoning may be both positively and negatively capitalized and the net effect depends on parcel characteristics and the political setting in which zoning is adopted.

Economist Michael T. Peddle in his essay Farmland Protection Policy: The Effects of Growth Management Policies on Agricultural Land Values asserted that: “it is well-established that, other things held constant, the greater the value of agricultural land in an alternative non-agricultural use, the more likely the land is to be converted to non-agricultural use.” His essay systematically investigated the relationship between agricultural land value, agricultural land conversion and the choice of growth management tools on the part of local communities.¹⁸

Mr. Peddle described the great variety of interacting factors affecting the valuation of land and its conversion rate. He agreed that the market price for land was efficient because it accurately reflected all the incorporated attributes and characteristics of the land, including the economic value of its potential uses. This price efficiency also means that constraints on the use of land, both actual as well as those reasonably expected will be accounted for in the market price of the land.

Mr. Peddle noted that in addition to these previously mentioned factors, expectations could play a great role. Local land use norms, community values and politics often influence the investment expectation of landowners and render it all the more difficult to develop universal expected price effects for different forms of growth management policies. In spite of this caveat, Mr. Peddle nevertheless proceeded to rank a limited number of growth management tools in terms of: 1) effectiveness in slowing the conversion of land, and 2) feasibility for slowing the conversion of land.

In terms of effectiveness, zoning was ranked as significantly less effective than a growth moratorium, transferable development rights, purchase of development rights or agricultural security areas. This was based on a determination that zoning regulations can be easily changed out of legal or practical concerns through the granting of zoning variances. Expectations of change can diminish the “price” effectiveness of zoning standing alone, or stated otherwise, such zoning is not a particularly effective tool in preventing agricultural land conversion on the fringe of established communities.

¹⁸ Michael T. Peddle. Farmland Protection Policy, The Effects of Growth Management Policies on Agricultural Land Values. American Farmland Trust, Center for Agriculture and the Environment, Working Paper Series 97-7, DeKalb, Ill. January 1997.

Mr. Peddle found that if agricultural zoning was strictly enforced and was a part of a comprehensive planning process, it served as a low cost and effective means of slowing the conversion of agricultural land as well as maintaining the relative value of farmland in its non-developed state. He further outlined the provisions necessary to retain effective agricultural zoning: hardedge boundaries to the zone, a focus on in-fill development, and placing development contiguous to developed areas.

In terms of feasibility, zoning ranked highest over all other growth management techniques. This was because he found most people were familiar and comfortable with basic zoning regulations. The fact that zoning is the most pervasive preservation/growth management tool in use in the U.S. today would seem to corroborate this judgment.

In June 1998, the American Farmland Trust through its Senior Vice President for Public Policy, Edward Thompson, Jr., conducted a nationwide survey of 1,729 farm, ranch and forestland owners across the United States. One of the issues the Trust wanted to address via America's agricultural landowners was how environmental regulations affected their property values. The Trust felt that this was important because it reflected how landowners and the public were currently sharing the cost of protecting natural resources. If regulations were determined as having an extensive negative impact on property values, landowners could be bearing a disproportionately large share of the cost. If, on the other hand, the impact was less widespread, it could mean that the public was sharing more of the cost.

Landowners were asked whether their property had experienced a small, moderate or large reduction in value as a result of four common types of regulation: wetlands, erosion control, endangered species and zoning. A catchall "other" category was also provided. To assure that they would not miss any impacts, they did not specify any particular law or which level of government was imposing the regulation.

The findings were that a large majority of the landowners (71.4%) reported that they had not suffered any loss of property value from the most common types of environmental and land use regulations. For zoning in particular, 90.3% said they experienced no loss of property value. As to the size of the loss, 2.2% said that they experienced a small loss, 3.6% said they experienced a moderate loss, and 3.9% said they experienced a large loss for a total of 9.7% experiencing any loss whatsoever.¹⁹

E. Summary

It is said, "All politics is local." Similarly zoning's effect on land values can be said to depend on the context in which zoning is inserted and with which it interacts. Conventional wisdom that zoning has a uniformly negative effect on land prices can be dismissed as untrue, but so too would be an assertion that it has a generally positive or

¹⁹Edward Thompson, Jr., Sharing the Responsibility: What Agricultural Landowners Think About Property Rights, Government Regulation and the Environment, American Farmland Trust. Washington, DC. June 1998.

neutral influence on prices. Individualized study analyses, both empirical and theoretical, provide differing answers applicable to differing circumstances and characteristics of land parcels: that is to say the context of the land.

Among the factors that interact one with another and with zoning to determine “context” for land conversion and price purposes are:

- Zoning; isolated or part of a comprehensive planning process; expectations
- Suitability of the land for alternative “developed” uses; for agricultural or rural use; size of plots
- Location, location, location; value of the land including climate, accessibility to roads, highways and airports, availability of amenities, resources, product markets, availability of basic services such as water, waste systems, electricity, good schools whether it is near or is a low crime area etc.
- Proximity to growth pressures; or how close and intense is growth and direction of growth
- General economic conditions; local, regional and national; the robustness of economy, interest rates, budgetary circumstances
- Legal limitations; limitations imposed by “takings” clause of the U.S. Constitution and other legal limitations
- Political setting and community values and traditions

CHAPTER III. The Rural Landscape-Maryland

A. Status and Trends

For Maryland, the U.S. Department of Agriculture's Natural Resource Conservation Service Inventory (1997) showed the State had 1.6 million acres in cropland, 2.4 million acres in forestland, 478,000 acres in pasture and 321,000 acres in other rural uses.²⁰ Maryland's data also showed that 1.2 million acres of land was urbanized and that urbanized land had increased by 177,000 acres between 1992 and 1997, an annual urbanization rate of almost 36,000 acres per year.²¹ The increase in urbanized lands by and large came directly from the rural land base as the Inventory showed an annual decrease in the State's rural land base of 170,000 acres from 1992 to 1997.²²

Prior to the 1960s, Maryland focused more on attracting growth than on protecting open space and rural amenities. Similar to the national trend in Chapter 2, Maryland relied upon zoning to regulate land use, separating unlike land uses and specifying maximum development. During this time in many counties, zoning in the most rural areas historically allowed residential development at a density of 1 dwelling unit per 3 or 5 acres. By the 1960s, increasing pressure from urbanization increased the rate at which farm and forestland were disappearing. As more of privately held land was converted, concerns increased over not just the loss of farmland but also the loss of open space and rural vistas, as well as the impact to the Chesapeake Bay.

Despite the trend however, Maryland is known for and has one of the most successful portfolios of agricultural and open space land preservation policies in the United States. This is because the State put into place several landmark programs from the 1970s through the 1990s and took advantage of several programs available at the Federal level. These included The Maryland Environmental Trust (established 1967), Program Open Space (enacted in 1969), the Maryland Agricultural Land Preservation Program (enacted in 1977), Forestry Legacy Program (Approved in 1996), Rural Legacy Program (enacted in 1997), Greenprints Program (enacted in 2001), the Conservation Reserve Enhancement Program (enacted in 1997) and the Federal Farmland Preservation Program (enacted 2003). So effective have these programs been that over the last several years more acreage has been retained for farm, forest and natural resource protection than acres lost. Given the budget problems at the State level, predicted to impact several fiscal years, it will be hard to determine whether this trend will continue. What is important to note is that new initiatives are taking place in several counties across Maryland; initiatives that promote the preservation of working lands and open spaces; which build upon an effort that began in the 1970s.

²⁰ U.S. Department of Agriculture. Natural Resources Conservation Service. National Resources Inventory Summary Report. 1997.

²¹ Ibid.

²² Ibid.

B. Literature Review - Effect of Downzoning on Preserving Working Lands – the 1970s & 1980s Efforts

In the 1970s several counties enacted agricultural protection zoning and implemented county-level farmland preservation programs. These efforts complemented the state-level efforts noted above and allowed counties to exert their own preferences over the pattern and location of lands that were preserved. Efforts in the more rural areas of these counties reduced development densities from 1 dwelling unit per 3 to 5 acres to 1 dwelling unit per 15 to 25 acres.

The County that is often referenced for agricultural land preservation is Montgomery County. In 1964, a concept of “wedges and corridors” was introduced. The wedge was envisioned as one large area, used to designate open space, low-density residential, rural village, and preservation uses. The 1969 General Plan enhanced this concept by providing for specific agricultural and rural open space preservation alternatives including incentives and regulations designed to mitigate development pressures and to promote the preservation of farmland in concert with rural open space and appropriate residential development. In 1981, the County Council passed specific implementation policies and procedures for downzoning its Agricultural Resource Area and simultaneously implemented a transfer of development rights (TDR) program. The reserve, or “wedge” area was designated the “sending area”, or the area from which development rights could be sold. The County designated “receiving areas” where developers could use development rights they purchased from farmers to build at densities higher than what was allowed by the underlying zone. The downzoning reduced development potential within the reserve from 1 dwelling unit (du) per 5 acres to 1 du per 25 acres, illustrative of a large lot zoning approach. However, application was more akin to a fixed area base allocation approach as the acreage per dwelling unit had to be on 5 acres and clustered to retain the overall density provision of 1 dwelling unit per 25 acres.

The downzoning effort of Montgomery County stood as a model for preserving large tracts of farmland and open space when it was enacted, and is still applauded and referenced by others. While the retention of working lands and open spaces were the noted hallmark of the program, it should be noted that the value per TDR did not hold at a consistent rate over the initial years of application. Landowners experienced a decline in the value of their property in 1983, even though value held steady from 1981 through 1983 at \$5000 per TDR. From 1983 to 1988 the value of the TDR dropped: by \$250 in 1984, by \$700 in 1985, by \$80 in 1986 and by \$220 in 1987. This was because there were not enough designated sending areas in the County to meet the demand. The preceding inference does not seem consistent with basic economic theory – if supply is short, price should increase. Once an increase was made to the sending areas, the value of the TDR increased from \$4200 in 1988 to \$8500-\$10,000 for 2002.

Baltimore County has a very interesting history in dealing with development pressure. A recently completed Senior Thesis by Jill Brewer entitled “Rural Conservation in Baltimore County: The Creation, Development, and Influence of the Valleys Planning Council and the Plan for the Valleys” describes that history and the approach taken by the

County.²³ In 1967, the County established its Urban-Rural Demarcation Line (URDL) that designated urban and rural land as distinct land uses, where rural areas would not receive county water or sewer. In 1975, Baltimore County enacted its downzoning provisions that took effect in 1976. This action was needed because despite the presence of the URDL, development was continuing to expand in those very areas where there was a desire to keep the rural character. When downzoning was enacted, the Rural Conservation Zone-2 (RC-2) went from one dwelling unit per one acre to roughly one dwelling unit per 50 acres.

According to planners in the Department of Environmental Protection and Resources Management, not only was the downzoning influenced by the demand for housing and “farmettes”, but also downzoning itself was a major factor influencing the acreage value by increasing it dramatically. Baltimore County has been praised for retaining its open spaces, areas for reservoir protection, as well as the economic base of its horse farm sector. In fact, this has been most impressive given that the County is located so close to the urban area of Baltimore City and has experienced unparalleled growth pressure over the last 10 years.

In a recent review of the effect of these accomplishments, the Rural Conservation Zone has maintained an over all density of about one dwelling unit per 50 acres. (In fact, the County has downzoned an additional 10,000 acres from one dwelling unit per five acres to one dwelling unit per 50 acres in the past decade). Furthermore, the value of the agricultural land has continued to increase.

In Frederick County, prior to 1976, the agricultural district enabled lots to be constructed at densities of approximately 1 lot per 1.5 acres. Subsequent to the downzoning, the average realized density was 1 lot per 15 acres. The County’s program relies upon subdivision techniques and agricultural zoning in coordination with the Maryland Agricultural Land Preservation Program to preserve the agricultural land. Three lots can be subdivided from a 25-acre parcel, with one more lot for each additional fifty acres. Lots can be no bigger than two acres, and have to be clustered if more than three lots are used. Viewed by some as being highly protective of agricultural lands,²⁴ the approach is being enhanced by a County Installment Purchase Agreement. The County recently approved a point system for ranking of agricultural lands in the fall of 2001. It is buying zero coupon bonds funded by the increase in the County’s recordation tax.

Carroll County enacted an agricultural zoning ordinance in 1978 on 184,000 acres, nearly two-thirds of its land area. The ordinance restricted development to one lot per 20 acres. The County also utilizes the Maryland Agricultural Land Preservation program to purchase easements. In 1989, Carroll County adopted an incentive program which paid for an appraisal of the development rights, a 5 percent up-front payment when a farmer

²³ Jill C. Brewer, Rural Conservation in Baltimore County: The Creation, Development, and Influence of the Valleys Planning Council and the Plan for the Valleys. A Senior Thesis in Sociology, Department of Sociology and Anthropology. Washington College, Chestertown, MD May 1, 2003 Unpublished.

²⁴ Farms for the Future: A Strategic Approach to Saving Maryland’s Farmland and Rural Resources. American Farmland Trust. Washington, D.C 1998.

established an Agricultural Land Preservation District, and a second 5 percent payment when an easement was sold to the Maryland Agricultural Land Preservation Foundation. In 1992, the County established a Critical Farms Program that guaranteed a minimum easement payment to a new owner if the owner was not successful in the State program. They also developed an Easement Priority Scoring system in 1993 to provide recommendations to the Maryland Agricultural Land Preservation Foundation on County preferred parcels. The County considered implementing a Transfer of Development Rights program in 1997 but the idea was rejected.

An analysis by the American Farmland Trust in 1997 showed that the zoning ordinance was working, giving the County time to permanently protect the land through easements. In a recent article by William Rasmussen of the Baltimore Sun entitled: “Marking Progress in Saving Farmland,” it was noted that Carroll County was 40% of the way towards reaching its goal for agricultural land preservation. As noted by Mr. Rasmussen, it took the County 23 years to secure easements to preserve 40,000 acres of farmland, and planners hope that they will reach the goal of 100,000 acres by 2020.

In 1978, Howard County enacted protection measures aimed at the preservation of 25,000 acres of farmland. The number was changed to 30,000 under the 1990 General Plan. Howard County does not have open space zones or agricultural zoning districts. Instead, the Rural West is the area identified by the County as being outside the Planned Service Area for water and sewer.

Two zones comprise the Rural West: the Rural Conservation and the Rural Residential districts. The Rural Conservation district is the priority area for protection, promoting the use of various tools for easement acquisition and density sending. In the Rural Conservation district, properties over 20 acres must cluster at a gross base density of 1 dwelling unit per 4.25 acres with a minimum 1 acre lot size. Properties less than 20 acres may cluster or may develop using a minimum 3- acre lot size. In the Rural Residential district, property owners have a choice of clustering at a gross base density of 1 dwelling unit per 4.25 acres with a minimum 1- acre lot size, or developing with a minimum 3-acre lot size. According to the Howard County Department of Planning and Zoning, as much as 90% of the development in the Rural Residential district occurs using the optional clustering provisions.

Howard County has several different options for preserving land. In all cases, a preservation easement is placed on the property that removes most of the development rights. The property owner retains ownership of the land and can continue to use it for agricultural purposes. The programs available for purchasing of easements consist of: the Howard County Agricultural Land Preservation Program (ALPP), the Maryland Agricultural Land Preservation Foundation (MALPF) program, and the Density Exchange Option (DEO).

Under the County’s ALPP, an Installment Purchase Agreement (IPA) is used which provides periodic principal and tax-free interest payments over the course of a 25-30 year period to the landowner. The total amount paid to the property owner ends up being

more than two times the purchase price offered for the easement. While this program has been successful, the County is considering an increase in the per acre maximum offer price above the current \$7200 per acre maximum to \$20,000 maximum, and a reduction in the minimum acreage requirements for participation in ALPP because of the continued increase in development pressure and the need to be competitive.

The DEO program is a private transaction between a developer interested in purchasing development rights, and a property owner willing to sell them. The funding provided by a developer is typically a cash settlement. In exchange, the property owner records a permanent preservation easement on the property. The County is not directly involved in the process, but the Department of Planning and Zoning does maintain a list of developers interested in purchasing and property owners interested in selling.

In July 2002, the County ranked 12th in a Farmland Preservation Report survey²⁵ of the nation's top local programs. It had preserved 18,838 acres through its farmland program and through regulatory set asides via the density exchange program. These various options have helped not only with the retention of farmland, but have also offered the farmer options to protect equity investment in the property however, the overall density being attained is 4.25 acres which may affect the ability to retain large agricultural acreages.

Anne Arundel County enacted its downzoning provisions in the "South County" area to protect the rural nature and agricultural land remaining in the County. The intent was to keep this portion of the County rural as opposed to the more developed northern part. The Rural Agricultural Zone changed from 1 dwelling unit per 2 acres to 1 dwelling unit per 20 acres. While the aim and objective was 1 dwelling unit per 20 acres, there were compromises made to the downzoning provisions. Bonus lot provisions were created in which every property owner affected by the downzoning could create two lots. There was also a family conveyance provision in which there was no limit to the number of lots created under an Intra-family Transfer. A property owner could also subdivide the property if the soils were not agricultural soils but were in the Rural Agricultural Zone, and a property owner could develop up to 30% of the non-agricultural area to a density of one dwelling unit per one acre. Furthermore, if a property owner was adjacent to an existing subdivision at one dwelling unit per two acres or greater, and the owner's land abutted the subdivision at 50% or greater, the owner could apply for a Special Exception and develop at one dwelling unit per 2 acres within 1000 feet of the boundary. Needless to say, the good intent was outshined by the compromises with an overall density attainment being one dwelling unit per 7 acres instead of one dwelling unit per 20 acres.

Since 1981 however, changes have been made to several of the compromises. In 1989 the provision that allowed subdivision of property on non-agricultural soils was repealed. In 1989, the alternate density provision was modified to include requirements that one's property had to be on a major road and abutt 25% of that road. And, in the 1990s the bonus lots were reduced to one from two and the family conveyance provisions were

²⁵ Farmland Preservation Report. Volume 12, Number 6, Bowers Publishing, Inc., Street, MD. July-August 2002

tightened. With these changes in place, the Rural Agricultural Zone currently has an approximate yield density of one dwelling unit per 12 acres. The County is hoping to return to the one dwelling unit per 20 acres as close as possible.

Were the agricultural lands and the rural nature of South County maintained? Not really, because there were too many exceptions to the density that initially undermined the overall intent of the downzoning provisions. Was the equity value in the land maintained and/or increased? Yes. According to Planning and Zoning Department officials, the value of agricultural land increased from \$3000 per acre (which was the agricultural value) to \$5000 per acre for development rights. That coupled with high demand for “farmettes” close to the urban areas of Annapolis and Washington have helped maintain and increase the value of the property.

C. Empirical Research - the Effect of Downzoning on Equity Preservation – Assessing the Impact of the 1970s and 1980s

Review of the previous section shows that several of the measures implemented by the Counties have helped to retain and preserve working landscapes and open spaces. However, it was not until the 1990s that two studies were performed in Maryland to find out whether downzoning was a tool that also preserved the equity of the landowner.

1. Resource Management Consultants, Inc. Analysis

In 1991, an empirical study was done by Resource Management Consultants, Inc. to determine the relationship of zoning to sales and value of land over a 15-year period in eight Maryland counties (6 with agricultural zoning and 2 without such zoning). The counties that were involved in the study and that had enacted agricultural zoning ordinances were Anne Arundel, Carroll, Baltimore, Frederick and Montgomery. As Caroline County had only recently enacted its zoning ordinance (1990), the effect could not be measured. The assessment was done because farmers expressed concern that restrictive zoning was depressing the value of their land, reducing their equity and impairing their ability to borrow money. Furthermore, some banking institutions had indicated they agreed with farmers that zoning restrictions negatively affected land values and farmers’ equity.

Sales data of land sold within the agriculturally zoned districts of the six counties were examined to identify the existence of a relationship between restrictive zoning and land prices. Frederick County data were not analyzed because of difficulty in obtaining land records. Caroline County data were not analyzed because the restrictive zoning was adopted in 1990 and not enough data were available for a comparative analysis. To provide a control group for general price trends in Maryland during the same time period, Cecil and Howard counties were also studied.

Sales data were collected from the reports of agricultural land sales from Rufus S. Lusk and Sons, Inc. The sales price, acreage involved and location were noted for all land sales of twenty acres or more within the agriculturally zoned areas. Data were collected

for three years before restrictive zoning and for a number of years after. The information was compiled into charts to show any trends in land values before and after restrictive zoning was established. In addition to actual sales, other supporting data were examined, including Agricultural Census information, local assessment and tax data, lending institution land values and fair market appraisals of farmland undertaken by the State Easement Acquisition Program.

Lending institutions were contacted to determine how lending policies were affected by the imposition of agricultural zoning. The lending institutions contacted included the Farm Credit Banks of Baltimore, U.S. Department of Agriculture, Farmers Home Administration in Delaware that serves Maryland as part of its district, and a number of commercial banks that provide some agricultural financing

The study reached the following conclusions with respect to the specific land area and time periods covered:

- 2) Zoning ordinances that restrict the amount of non-farm development on agricultural land do not lower land prices or otherwise negatively affect farm equity. Fluctuations in farmland prices are more influenced by general economic trends, such as interest rates and prices for agricultural products.
- 3) Lending institutions do not make or deny loans on the basis of a parcel's development potential, but rather on the ability of the farm enterprise to repay its loans.²⁶

2. Valleys Planning Council Report

In 1996, Applied Data Resources, Inc., was retained by The Maryland Environmental Trust to conduct a study of the impact of RC-2 zoning (approximately one house per fifty acres) versus RC-4 zoning (one house per five acres) on the trading values of unimproved parcels of land in Baltimore County. The study area was confined to that portion of the County north of the Urban Rural Demarcation Line. The time horizon included the period 1986 through 1996, encompassing a full decade of purchases and sales, including a period of rapid growth in Baltimore County land values (1985-89), and a period of slower growth (1990-1996). Data on all sales of unimproved parcels of land 5 acres in size or greater falling in this portion of Baltimore County during the time period noted were analyzed for purposes of the study.

At the time a view that was held was that highly restrictive zoning could lower the value of parcels of land falling in the restricted area because the zoning would deprive the current and future owners of a possible use, that is, development of sale in small

²⁶ Robert J. Gray et. al., The Effects of Agricultural Zoning on the Value of Farmland. Resource Management Consultants, Inc., Washington, D.C. 1991.

residential plots. According to this view, a decreased yield of subdivision lots should translate into lower value for the land.

The countervailing view was that restriction on subdivision, while admittedly diminishing the number of possible uses, could maintain or enhance land values by preserving the likelihood of high-valued uses. In other words, the scarcity of available house sites created by restrictive zoning could cause the fewer, but larger blocks that had permitted house sites to enjoy a premium in value.

Working in conjunction with the staff of the Valleys Planning Council, Applied Data Resources, Inc. collected data on all land sales within the geographic area and time frame noted. Approximately 90,000 acres comprised the area studied.

Two types of analysis were conducted on the information retrieved. First, there was a calculation of the cross-tabulation of data showing the average price per acre of transactions grouped into mutually exclusive categories based on variables of interest. A cross-tabulation was performed for each variable of interest. The purpose of the cross-tabulation was to identify consistent trends in sales price that would lend support to one or the other of the views noted above. After cross-tabulations were calculated, a regression analysis was performed. The purpose of regression was to identify trends in sales price after accounting for variations in certain important characteristics. The conclusion from the effort was as follows:²⁷

- Statistical analysis of the 90,000 acres of land in Baltimore County showed that there was no significant difference between the value of land in the RC-2 or Agricultural Protection Zone (approximately 1 dwelling unit per 50 acres), and in the RC-4 or Reservoir Protection Zone (1 dwelling unit per 5 acres). The study was carefully controlled for several variables that could have confounded the data, including distance from Baltimore City and from major roads, varying school districts, accessibility, size of parcel, and date of sale. This was considered to be a striking result because the RC-2 zone only allowed subdivision at the rate of one dwelling per 50 acres, while the RC-4 zone allowed subdivision at the rate of one dwelling per five acres. The RC-4 zone in other words allowed on the average, 10 times as many subdivisions as the RC-2 zone.

D. Is Downzoning Effective for Working Lands & Equity Preservation? – The Current Picture

1. The County Interviews

Calvert County enacted its downzoning provisions twice, somewhat like a two-step process. The first step addressed commercial development and the second step addressed

²⁷ Applied Data Resources, Inc., Report to the Valleys Planning Council on the Trading Value of RC-2 Zoned Land Compared with RC-4 Zoned Land in Northern Baltimore County. Maryland Environmental Trust. Crownsville, MD. 1996. Page 6.

the residential build-out trend. The first downzoning occurred in 1984 when the zoning ordinance was approved. The Ordinance, based upon the 1983 Comprehensive Plan, addressed commercial zones that were inconsistent with the Comprehensive Plan. Town centers were created to “house” the commercial zone instead of having commercial centers develop all over the County. By placing them inside the Town Centers, it became more difficult to locate them elsewhere in the County.

Experiencing growth at a rate that could double the 70,000 population over 30 years, which would outstrip the roads, educational facilities and open space, on April 20, 1999, the second downzoning ordinance took effect. With the Comprehensive Plan as a basis, the County looked at the holding capacity that it could sustain and a decision was made to reduce the projected build-out by 50%. The areas designated for the 50% reduction were: 1) the town centers, 2) the growth areas designated around the town centers, 3) the rural zone which contained the farming and sensitive areas in the County and for which the County had 106,700 acres in total with a goal of permanently preserving 40,000 acres.

Prior to taking this action, densities in the Rural Zone were one dwelling unit per five acres. After the downzoning, the density became one dwelling unit per ten acres. Clustering is required for anything that is over one dwelling unit per 20 acres density in the Rural Zone and eighty percent of the land has to be left open in the Farm Community and Resources Preservation Districts; 50% in the Rural Community Districts. In the Rural Zone, once clustering for development takes place, the easement is given to the County and is recorded solely for non-construction purposes. Homeowners Associations can hold the easements, as can farmers. If the easement is not held by an entity, it can go to tax sale and the County can acquire it.

There are many options available for landowners in these areas. One can sell a Transferable Development Right to a developer building in the receiving area, that is the Town Center plus the growth area of one mile radius around the Town Center and the Rural Community District at one dwelling unit per five acres. Within the Rural Community District, the density can be “bumped up” to one dwelling unit per 2 acres, if 50% of the land to be developed is left in open space.

Another option for the landowner is Purchase and Retirement. A property owner can sell development rights to the County at the market rate (around \$2700 per acre). The County Commissioners provide monies for that purpose each year, though no more than 10 Development Rights are purchased per year from the same owner. For each year thereafter, one has to be placed on a list for whatever dollars are available.

A third option is a new program called Leveraging in which the County could purchase all of the development rights on a property and pay the landowner interest for 10 years, tax free, with the principal becoming due at the end of 10 years.

A final choice is to take advantage of the State Easement Program such as the Maryland Agricultural Preservation Program.

The result of this complex program is that very little development has been occurring in the Farm Community District and the Resource Protection District. The overall density has been retained to around one dwelling unit per 20 acres and the development that has occurred has been predominantly by family conveyance. According to the County Planning Department, land preservation can now fully compete with the development sector. A landowner can do just as well selling a development right as opposed to selling a portion of the farm for development. Prices have gone from \$2200 to \$3600 per acre.

In March 2003, Virginia McConnell, Elizabeth Koptis and Margaret Walls completed a report about Calvert County for Resources for the Future titled How Well Can Markets For Development Rights Work? Evaluating a Farmland Preservation Program. The authors noted that as of July 2002 in the Agricultural Protection Districts, more than 19,600 acres had been entered into Protection status. From these acres, 12,644 Transferable Development Rights had been sold, resulting in the permanent preservation of nearly 13,000 acres of land. The report also noted that about 13 percent of all agricultural and forestland in the County and nearly 10 percent of the entire County land area has been permanently preserved under the Transferable Development Rights program.

Caroline County downzoned in 1990, changing the density of one dwelling unit per one acre to one dwelling unit per 20 acres in the Agricultural District and the Open Space District. The reason for downzoning was the onslaught of applications for subdivisions. The County declared a moratorium for six months and appointed a citizens committee to look into the problem. The County had always allowed for four dwelling units to be developed on a tract of land, no matter what size the tract happened to be, though it had to be at least an acre, and the units could not be transferred onto someone else's land if the land did not perc. The County decided to also retain the 4 dwelling units per acre provision on the tracts of land to provide the farmers with options.

The County has a Transferable Development Rights program but it has rarely used it as the demand has not been high, and the per-acre value has been low. As a condition to the application of the program, the land for both the receiving and sending areas has to be buildable (i.e. percable). On the whole, there has been an average annual request for 30 to 35 applications for agricultural land preservation easements and a 1% annual residential growth rate. Large farm acreage is being retained and there has not been much pressure for large subdivisions, though during a most recent interview, exactly one year interviewing the Planning and Zoning Director, reference was made that this low demand and low growth rate is about to change. That being noted however, according to the Planning Office, before downzoning, the value of agricultural land was closest to the agricultural rate of \$1500 per acre. The value of agricultural land did increase by around \$300-\$400 per acre off the base rate.

Cecil County took a different approach by establishing two areas for special attention. The Rural Conservation District (NAR) to the North once permitted a density of one dwelling unit per one acre. In 1993 the density changed to one dwelling unit per five acres with the possibility of one dwelling unit per three acres as long as 60% of the parcel

being developed was retained in open space. The Resource Protection District (SAR) to the South also once permitted one dwelling unit per one acre. In 1993 that density changed to one dwelling unit per 8 acres with a possibility of one dwelling unit per 5 acres if 60% of the parcel being developed was retained in open space. Along with these densities came the provision that any parcel of land recorded as of April 15, 1976 could qualify for a minor subdivision, that is five building lots at one dwelling unit per acre. After that, the densities in the SAR and the NAR apply.

Cecil County has been described as a jurisdiction that offers the least form of protection for its open spaces and agricultural land because the overall density being attained for these areas is around one dwelling unit per five acres. Demand for housing has been very strong and the value of the land has risen because of pressure to develop. The County Council is looking at ways to better preserve these lands.

Charles County As of the completion of this study, Charles County had not enacted downzoning for its agricultural or conservation zones even though there is recent discussion to enact some form of downzoning based on recommendations from a Report recently completed by an appointed Rural Commission.

In 2001 the Agricultural Conservation and the Rural Conservation Zones in Charles County went from one dwelling unit per one acre to one dwelling unit per three acres. And, a landowner could obtain one dwelling unit per five acres with clustering.

The County has had a Transferable Development Rights program in place where owners of agricultural land (approved by the State) can sell their development rights to developers in the receiving areas (i.e. the development districts). However, this tool has not been used very often as farmers are currently benefiting from the tobacco buyout monies and the value per acre price is not encouraging.

Any protection afforded to the agricultural land has not been through downzoning; rather it has been through the adequate school facilities policy at the County level, which has been an effective check on growth. Another factor has been the tobacco buyout that provides farmers with an income for a period of time and creates a deterrent to selling the property at least for the time being.

In September 2000 a fourteen member Rural Commission was appointed to report on the status of agriculture and open spaces in the County and to make recommendations regarding growth management issues in the rural areas of the County. The report was complete in June 2003.

One of the charges to the Commission was to evaluate the effectiveness of the Agricultural Conservation and Rural Conservation zone's permitted density of one unit per three acres for conventional subdivisions. The Commission was asked as a part of this evaluation to examine "build out" scenarios for the rural areas of the County based on existing development regulations. They were also to contrast their examination with rural acreage that could be protected through more restrictive zoning and subdivision

regulations and to provide recommendations for permitted densities and desired lot sizes in these rural areas”²⁸ Several interesting findings were made by the Commission.

First, the Commission recognized that there were three areas in the County that were very important and around which the comprehensive plan should be revised. The northeastern area east of Waldorf was identified as one that was developing into a rural residential area. The southeastern area (including Cobb Neck) was identified as being the true agricultural area. The Western peninsula was identified as an area to be preserved as a forest conservation zone.

Second, while not accepted unanimously by the Commission, it was the opinion of a majority of the Commission members that in order for the County to protect its rural character, the Western Peninsula needed be rezoned to one dwelling unit per twenty acres, and identified as a Conservation Zone. The members noted that in order to avoid severe financial impacts on the property owners, a Transferable Development Rights program needed to apply to the rezoned land at a one dwelling unit per three acres density. They also noted that a provision for the development of homes for family members on existing family owned tracts should also be included. Provisions for development at higher densities in the “villages” were also recommended.

Third, the Commission noted that it preferred incentives rather than restrictions where possible to preserve the character of the County and it recommended the use of a Transfer of Development Rights program and cluster development in the current Agricultural Conservation and Rural Conservation Zones for all new housing development. It was their hope that this would preserve critical open space by Development Right sales rather than by restrictive zoning and subdivision regulations.²⁹ The report also mentioned that agriculture should be encouraged to remain in the County, that agriculture should look to new markets and specialty niches, and that the County should do all that it could to remove obstacles to innovative agriculture. It was also recommended that the County think of ways through tax measures to bolster the agricultural community as tobacco cropping phases out.

Dorchester County enacted its downzoning provisions in October 1996. The zones affected were the Agricultural Conservation and the Rural Residential Conservation Zones. In sum, the downzoning affected all agricultural land outside of the Critical Area. The density before downzoning was one dwelling unit per one acre in the Agricultural Zone and one dwelling unit per two acres in the Rural Residential Zone. After downzoning the density for both areas was one dwelling unit per 20 acres. While both zones are the same, overall density, lot size and bulk regulations differ and the County publishes a complex table characterizing what can and cannot be done in both areas.

²⁸ Charles County Rural Commission. Report of the Charles County Rural Commission. September 2002. Page 26.

²⁹ Ibid. p.27.

The County does not have a Transferable Development Rights program even though there is mention made of one in the Comprehensive Plan. If the County ever implements a program, the designated receiving areas would be those already identified by the County as Priority Funding Areas as well as those areas included in the ten year water and sewer plan.

Downzoning in Dorchester County came about because of Smart Growth and the passage of the Planning Act of 1992. The Planning Director noted that the County might not have progressed with downzoning had it not been for the Act. There was also a trend being seen with the subdivision of agricultural land in the northern part of the County. The soils are better-drained and hence good for septic and well. In fact, because of this trend, much of the support for downzoning came from the agricultural community in order to protect their lands.

Of additional interest is the existence of another regulation that has had a “dampening” effect on development pressure. Under a separate regulation, the number of lots that can be subdivided is based on what type of road to which the proposed subdivision is adjacent. Certain thresholds of access need to be met in order to build.

Kent County downzoned in August 1989. The downzoning applied to the lands zoned Agricultural and Resource Conservation District. Prior to downzoning the densities were one dwelling unit per one acre and one dwelling per 2 acres with a small amount of acreage enabling ½ acre lots to be created. After downzoning there were three sets of design standards and maximum lots sizes that could apply to the landowner. First, if a landowner used an enclave layout with design standards and maximum lot sizes, the density would be one dwelling unit per 10 acres. A second option, also under specific conditions would be one dwelling unit per 20 acres. A third option would be one dwelling unit per 30 acres, especially if one wanted to develop a “farmette”.

What really spurred the County into downzoning was the loss of two favorite farms which everyone expressed concern about when development took place. This loss occurred in the mid-to-late 1980s. The farmers came to the County and asked what could be done so that further loss would not take place. The County Commissioners placed a moratorium on building in the Agricultural Zone until something could be figured out. An Agricultural Advisory Commission was appointed which identified the farms that were essential to protect. The identification was based on soils and productivity as well as maintaining large blocks of land.

According to the Planning Director, Kent County is known as the County that is committed to agriculture. To prove its commitment, the County eliminated its miscellaneous uses in the Agricultural Zone that were not agriculturally related. What are allowed in the zone are agro-businesses, related uses such as seed experimental labs to grow hybrid and stronger strains of seeds, a spinach packing plant, and a feed blending operation. This has allowed for diversification of the farming interest.

According to the Planning Director, downzoning is working in the County. Farmland area is being preserved. Ninety percent of around 120,000-130,000 acres of agricultural lands are at one dwelling unit per 30 acres. The values of farmland are higher than they were before the downzoning, and the Planning Office observed that this standard applies across the entire County. In the early 1980s the value per acre was \$3000. This was because there was an influx of German interest in the good farms. The rise was followed by a depression in the market and the per acreage value dropped to \$2500-\$2800 per acre. After the downzoning, acreage value with an easement settled around \$3000-\$3500 per acre. Without an easement, the acreage value has been around \$4000 to \$4500 per acre.

In Queen Anne's County, between 1947 and 1961 and prior to the adoption of the County's first Comprehensive Plan in 1965, there were 9000 lots created with no rhyme or reason. Eighty percent of those lots were on Kent Island. In 1985, a performance-based zoning plan for the County was developed, however experience showed that this plan allowed for much speculation and growth to occur. In 1987, another Comprehensive Plan was passed to slow down the rate of growth, to identify growth areas, and to allow for some growth in the agricultural areas without losing the agricultural base. Eighty-eight percent of the land base in the County was zoned rural and through the use of various programs, twenty-seven percent of the rural lands have been protected through the Maryland Agricultural Land Preservation Program, Greenprint, Rural Legacy, the Maryland Environmental Trust easement program, and through Transferable Development Rights and deed restrictions on open space.

The County also enacted two measures to support the Comprehensive Plan. The first was a Transferable Development Rights program. That Program has not proven effective because there has not been much of a demand for its use. A second measure was enacting a clustering provision for the Agricultural Zone. Prior to the clustering provisions taking effect, a density of 1 to 2 dwelling units per acre was allowed. After the passage of the Comprehensive Plan, the density became one dwelling unit per 8 acres with clustering required for all development on 15% of the property, thereby maintaining 85% in open space. (It is important to note that the majority of this protected land in Queen Anne's County is in the category of deed restricted open space as part of the cluster provisions for subdivision projects).

The County Planning Department referenced that in the last 10 years, the majority of the building permits (approximately 400 per year) had been approved for the areas identified as growth areas, and that the creation of new lots in the agricultural zone had been very low. When asked about the value of the agricultural land and whether landowners were able to maintain their equity, the County staff said that they could not answer that question because the clustering provisions were relatively new and a trend had not yet been discerned.

St. Mary's County. In May 2002, under the newly approved Comprehensive Plan, the County enacted a one dwelling unit per 5 acres density for the Rural Protection District. The density prior to that had been one dwelling unit per 3 acres. The previous Planning Director for the County noted that the one dwelling unit per five acres was what the

County had all along as its overall density. The Director also noted that 45% of all building permits were approved for the rural area, with 44% being located in the growth area.

Prior to the passing of the Comprehensive Plan, several proposals had been discussed for the preservation of the rural lands in the County. The proposals ranged from one dwelling unit per 10 acres to one dwelling unit per 20 acres to a sliding scale approach based upon particular parameters. The final vote from the Commissioners approved the one per five acre zoning.

This was a decision that was not without controversy. In April, the Editorial section of the Enterprise (notably the April 5th and April 12th publications) featured the position of two County Commissioners who were the only two of five to be re-elected:

We know, however, that reducing density from 1-in-3 to 1-in-10, with the added regulations, will cause immediate injury to property owners and may adversely effect the economic engine of the county. We are therefore not willing to gamble with individual property rights or the economy of St. Mary's County and go to a 1-in-10 density when we know that the rural heritage of the county will not be lost in the next few years by going to 1-in-5 density – and in fact believe that the 1:5 density will protect the rural heritage.

The future of St. Mary's County lies for the most part with a new team of County Commissioners and the constituency they serve. The Commissioners were elected in part because of the conservative approach they felt needed to be taken with land use decisions. And, the County has provisions in place that can complement decisions to preserve agricultural land such as a Transfer of Development Rights program that was approved in 1990. While there has been very little activity within this program, at some point, the County may determine that it can be a valuable tool to keep working landscapes viable.

Eventually decisions will need to be made by the County officials as to how a balance will be maintained between the rural working landscapes and the areas receiving pressure for development. While those decisions may not necessarily have to be made within the next two years, a hiatus point will most likely be reached in five years, especially if loss of agricultural land continues and development pressures remain constant.

In Talbot County, there was initial concern about the development pressure in the Northern part of the County, thus around the 1989/90 period, the Talbot County Council placed a moratorium in effect in order to develop a way to slow down development and to preserve open areas. The concept of downzoning was “floated” to various interests at the one dwelling unit per 20 acres density. The County marketed this concept, particularly to the Farm Bureau because it wanted acceptance for the concept. Fifty percent of the Bureau supported the downzoning, the other 50% wanted different options. In June 1991, the County downzoned the agricultural land (except for the Critical Area

Rural Conservation Area that had already been downzoned) to one dwelling unit per 20 acres. Prior to the downzoning, density was one dwelling unit per 2 acres.

To strike a balance among those supporting the 1-in-20 density and those favoring other options, the County made other provisions available to the farming community as part of passing the downzoning provisions. The following is a description of those options based on 100-acre parcel size:

- 1) Rural Option- a landowner could get 5 lots at the 1 dwelling unit/20 acres density plus 3 lots (total of 8 lots),
- 2) Cluster Option – a landowner could get 1 dwelling unit/10 acres plus 3 lots (total of 13 lots) but had to keep 70-75% of the land open forever.
- 3) Cluster Transfer of Development Rights Program Option – a landowner could get 1 dwelling unit per 5 acres with the same requirements for open space as the Cluster Option and with 10 of the units obtained by Transfer of Development Right (total of 23 lots).

In 1989, the County also created a Transfer of Development Rights program known as the Reservation of Development Rights Program. Its purpose was to increase the density in the growth areas by transferring the rights from the resource and open space lands to those identified for growth. This provision however has not been well used.

Development pressure has been the central factor in the rise of the value of rural properties in Talbot County. In fact, interior lots in the County, of around 2 acres, sell for \$70,000 with waterfront properties being valued at around \$1.9 million. However, to create a stronger market for development rights and to strengthen the effort to preserve agricultural and rural lands, the focus for the County will be a two-fold one with the first being to reduce the densities in the open areas and establish “rings of growth” around the core towns and the second being the development of a green plan for the County that would be incorporated into the comprehensive plan.

In an article that appeared in the November 14, 2002 issue of The Star Democrat Assistant Planning Officer, Frank Hall stated that the County’s proposed green plan was an adaptation of the Maryland Greenprint Program. Its purpose being to identify the most important unprotected natural lands in the County, linking those lands through a system of corridors or connectors, and saving those lands through targeted purchases and easements.

2. The Statistical Approach - Methodology

To determine whether equity value was retained for the landowners of agricultural and rural property in the previously mentioned counties, land transactions contained in a State database known as Maryland Property View 2001 were used. This database contains conveyance information such as price, size, improvements, assessments etc. for all land

parcels in Maryland. Information is provided through the county Departments of Assessment and Taxation and is assembled and updated by the Maryland Department of Planning.

In looking at the overall purpose for this study, the research team examined the information presented in Maryland Property View 2001, and made decisions to include and to exclude certain land transactions: Those transactions that were included consisted of those that were:

- “arms length” transactions
- Transactions occurring on parcels located in the agricultural zone of the county
- Transactions involving parcels of 20 acres or greater in size

Transactions were excluded if:

- No consideration was shown or listed
- It was a part of a multiple property transaction
- It was a transaction for a commercial use
- It was encumbered by a conservation easement
- It was a marsh property
- It was a waterfront property

Transactions were further screened and carefully scrutinized if they showed unusual cost per acre values, unusual ratios of consideration to the state assessment, inconsistent descriptions of land area or acreage, and differences between the “improvements” category when compared to the “improvements” assessment. An additional screening was also performed to remove transactions with the same transaction date and consideration paid because it was a part of a multiple property transaction. Properties that had unusual values for these criteria were also examined on the website of the State Department of Assessments and Taxation (www.dat.state.md.us) to verify whether a property transaction should be excluded or remain in the database.

The statistical design concept used as the basis for the study was the Before-After: Control-Impact (BACI) design concept. A study county that had enacted downzoning was paired with a neighboring control county that did not implement downzoning, or had just recently enacted downzoning provisions. The expertise and judgment of the researchers, advisory groups, and local informants was used to determine which counties shared similar markets, and therefore could appropriately be paired in this way. The Before-After element enabled the land cost before and after implementation of downzoning in the study county to be compared with the before and after land cost in the control county. The Control-Impact element enabled a comparison to be made of the before and after shift in land value of the study county (the one enacting downzoning) to the before and after shift in the land value of the control county (the one with no downzoning action).

The “pairings” that were used were:

<u>Control County</u>	<u>Downzoned County</u>
Somerset	Dorchester
Queen Anne’s	Kent
Charles	Calvert
Queen Anne’s	Talbot

Prior to conducting the analysis, the study team created a null hypothesis which was: the before to after land value shift in the study county is equal to the before to after shift of the control county. If any of the analyses performed led to a rejection of this hypothesis, the conclusion would be that the zoning action had an effect on land value. If the null hypothesis could not be rejected, it could only be concluded that if the zoning action affected land value, the size of the effect could not be distinguished from the typical variation of land values.

The study team recognized that other factors could affect land value and that the statistical analysis would need to accommodate these factors. One factor was that land values generally increase over time. To account for this, time was included as a covariate in the land cost model. In addition, because the control county shared the same market as the study county in each pairing, any extrinsic change in land value would affect both counties.

Another property factor considered by this study was the effect of location on land price. To adjust for this, an ancillary analysis was developed where the before and after transactions were paired using a nearest neighbor concept. The nearest-neighbor pairing was used to address the question: Would our perception of the results change if we adjusted for location effects? The straight-line distance between the before and after zoning property transactions was computed. Properties were paired with their nearest neighbor based on this distance. If a nearest neighbor had already been paired with another property because of being closer, then the second nearest neighbor was selected. Properties were paired with nearest neighbors with the constraints that no property was used more than once and the nearest neighbor had to be located in the same county and have the same improvement status. The pairs were introduced to the land cost model to adjust for spatial effects. If the intra-pair distance exceeded 2.5 miles, the pair was excluded from the analysis.

The nearest-neighbor approach has a disadvantage in that it reduces sample size to the minimum of the before group and the after group. Therefore, because of this reduction in sample size, it was used as an ancillary analysis.

The formal test for the zoning effect can be described by a sequence of estimates from the model. For both the Before-After: Control-Impact, and the nearest-neighbor Before-

After: Control-Impact, land cost adjusted for linear trend was estimated for each county at the point just before and just after the zoning action. The next step was to compute the step increase or decrease in land value at the time of downzoning as the difference of the after cost minus the before cost. The third step was to compare the step change in the study county to the step change in the control county. If the two steps differed significantly (by an amount greater than would be attributed to chance), it could be concluded that the zoning had an effect. If the step in the study county was larger than the step in the control county, the effect would be positive. Conversely, a larger step in the control county would indicate a negative effect.

Separate analyses were done for both improved and unimproved properties. To adjust for improvement costs and arrive at a cost per acre for land, the following calculation was used:

Consideration for Land=Consideration X (assessed value of land/total assessed value)

Because the adjustment based on the ratio of assessed land value to the total assessment did not make land values for improved properties comparable to land values for unimproved properties, the assessment was performed separately for improved and unimproved properties. Because the adjustment described above appeared to bias the land costs obtained from improved property transactions, greater emphasis was placed on the results from the unimproved property.

One further consideration was given with respect to the statistical modeling; whether to use cost/acre as the dependent variable or to use cost as the dependent variable and let acres be an independent variable. After using both approaches, it was found that the conclusions were the same, thus the more intuitive cost/acre dependent variable was chosen.

Prior studies indicate that costs tend to follow a log-normal statistical distribution. Therefore, it was appropriate to conduct analyses in the logarithm metric and take anti-logarithms to interpret the results. Thus, the logarithm base 10 of cost/acre was the dependent variable. The analysis was performed using a General Linear Model procedure of the SAS software system.^{30,31} The analyses confirmed that the assumption of log-normal distribution was appropriate to the data. By examining the variability of the data, it could be inferred how large the effective size would need to be in order to be detected as statistically significant by this study.

In addition to the statistical models that permitted this rigorous hypothesis testing, the data were also examined by a non-parametric smoothing procedure known as LOESS regression.³² While the LOESS procedure did not permit rigorous hypothesis testing, it

³⁰ SAS Institute Inc., SAS/STAT user's Guide. Version 6, Fourth Edition, Volume 2. Cary, N.C. 1989

³¹ SAS Institute Inc., SAS OnlineDoc. Version 8. Cary, N.C. 2000

³² William S. Cleveland. Visualizing Data. AT & T Bell Laboratories. Murray Hill, N.J. 1993.

had the advantage of not assuming a model for the data, but instead yielded an estimate of central tendency for the cost of land as it changed over time. The results of the LOESS procedure are presented in graphical form for unimproved property transactions only.

3. The Results

Dorchester-Somerset Counties

Dorchester and Somerset counties were paired because of similar markets at the time of this analysis and because both counties viewed their agricultural lands as being an important economic base. In October 1996, Dorchester County downzoned from one dwelling unit (du) per one acre in the Agricultural Zone and from one dwelling unit per 2 acres in the Rural Residential Zone to one dwelling unit per 20 acres in both zones. Somerset County maintained a consistent density of one dwelling unit per 2 acres or one dwelling unit per 4 acres in its agricultural area.

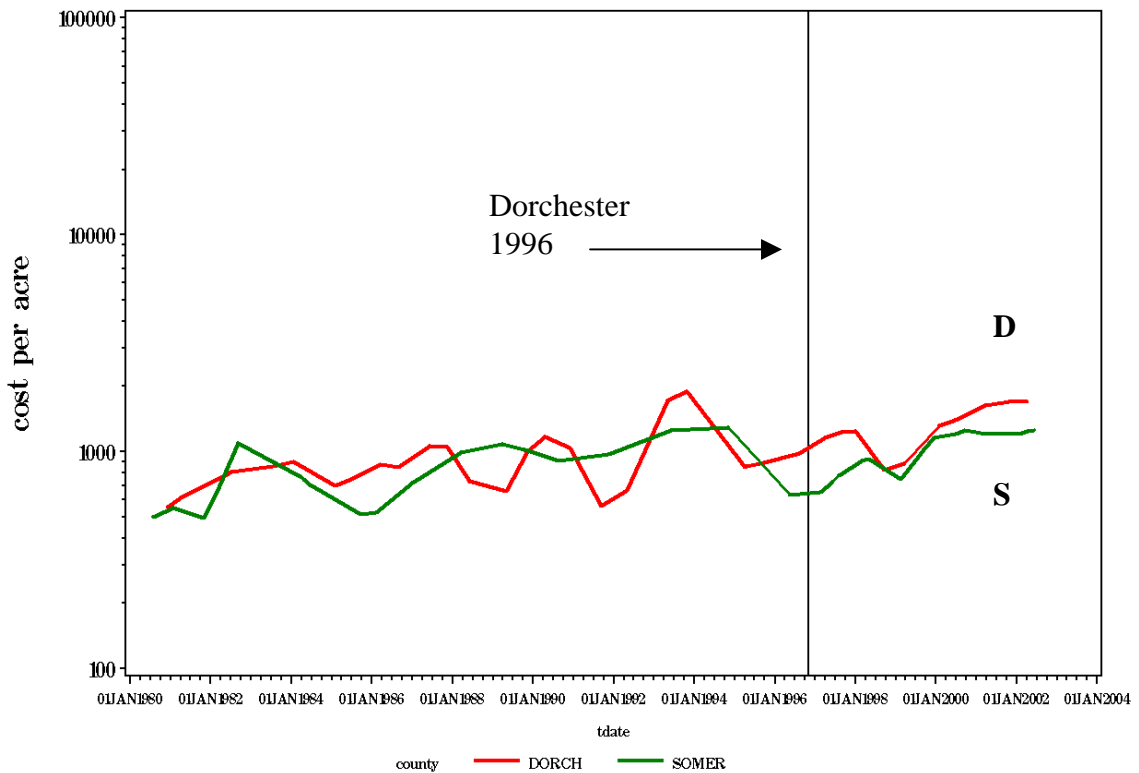
Applying the “inclusion” “exclusion” screening to the transactions contained in the 2001 Property View database for unimproved properties, and conducting additional screenings, a total of 159 transactions resulted for Dorchester County and a total of 201 transactions resulted for Somerset County. Table 1 titled: Transactions-Unimproved Properties: Dorchester & Somerset Counties presents that information, breaking it down into the number of transactions that occurred before the downzoning action in 1996, and after the downzoning action for both counties.

TABLE 1: Transactions - Unimproved Properties: Dorchester & Somerset Counties			
County	Before zoning	After zoning	Total
Dorchester	111	48	159
Somerset	124	77	201
Total	235	125	360

Beginning in the 1980s through 2001, the transactions for the unimproved properties noted in Table 1 were analyzed with respect to the mean cost per acre and whether there

was any statistical significance between the two counties as to the value and the shift in value for those transactions that had occurred before the downzoning action and after the downzoning action. A nearest neighbor analysis was also conducted to ascertain if there was statistical significance between the counties. Specific tables and text for both the unimproved and improved properties in Dorchester and Somerset Counties may be found in Appendix A. However, for purposes of this text and to enhance the reader's understanding as to the results for this pairing, Graph 1 containing the regression analysis is presented.

GRAPH 1. DORCHESTER AND SOMERSET COUNTIES



Looking at the Dorchester-Somerset results, it appears that before the downzoning took place in Dorchester County, both counties had experienced declines in land value, with Dorchester County showing a slight increase that continued after downzoning, and with Somerset County land values holding somewhat steady just before downzoning and slightly past the downzoning action. Soon after downzoning was implemented, property values in Somerset County began to increase, which was a trend also reflected in Dorchester County. Both counties show that in 1999 there was a drop in the value of the transactions, however, by the end of the period of record, the property values in the two counties had achieved parity.

Given that both counties seemed to track together after the downzoning action, and that Dorchester’s land values did not drop below that of Somerset County’s transactions, it can be concluded that for this analysis, downzoning did not cause a devaluation in the per acre value of the rural and agricultural lands.

Kent-Queen Anne’s Counties

Similar analyses as were conducted for Dorchester and Somerset Counties were also conducted for Kent and Queen Anne’s Counties, and they can be found in Appendix B.

Kent and Queen Anne’s Counties were chosen to be paired because the market pressure, particularly in the northern part of Queen Anne’s County was found to be similar to that of Kent, and that part of Queen Anne’s County is relatively rural with agriculture dominating. Furthermore, both counties value the economic base that agriculture provides to their respective economies.

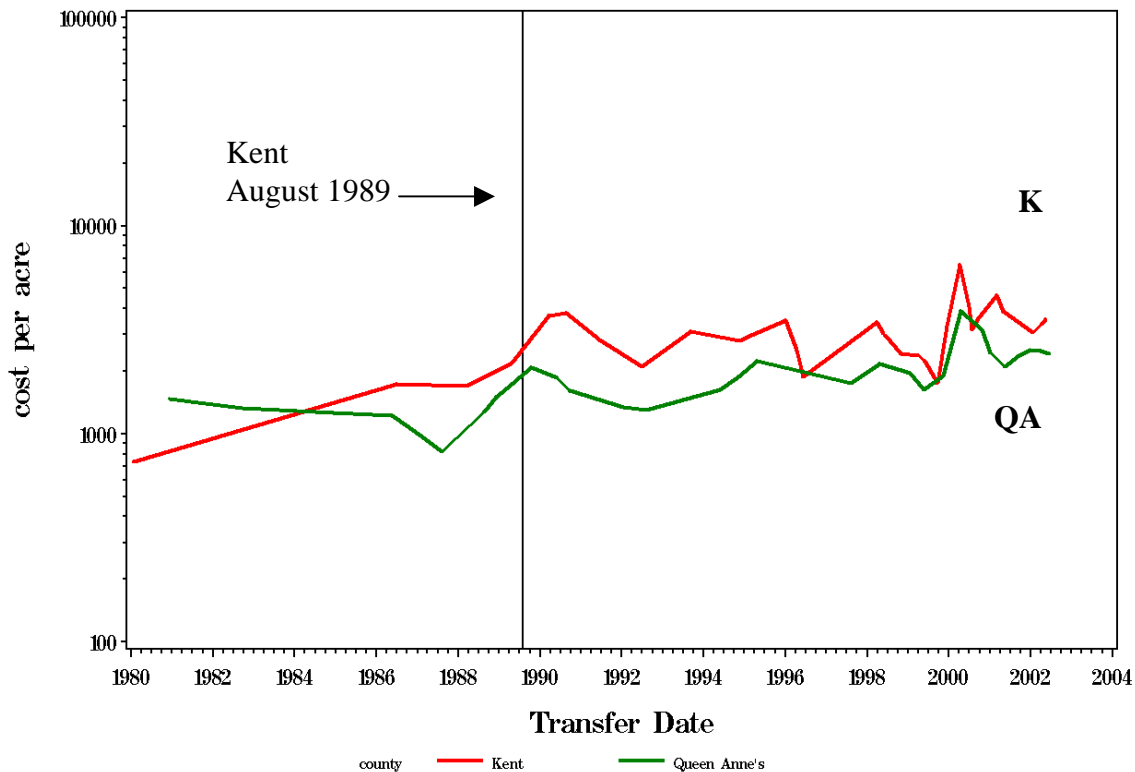
In August 1989, Kent County downzoned its Rural and Agricultural Zones from one dwelling unit per one acre or 2 acres to one dwelling unit per 20-30 acres. Queen Anne’s density for its agricultural zone went from one dwelling unit per one acre to one dwelling unit per 8 acres with clustering on 15%.

Table 2 presents the total number of land transactions for unimproved property in Kent and Queen Anne’s Counties. Kent had a total of 59 transactions, with Queen Anne’s showing a total of 154.

TABLE 2: Transactions - Unimproved Properties: Kent & Queen Anne’s Counties			
County	Before zoning	After zoning	Total
Kent	7	52	59
Queen Anne’s	47	107	154
Total	54	159	213

Taking these transactions over time for both counties, Graph 2 presents the visual results of the regression analysis.

GRAPH 2. KENT AND QUEEN ANNE’S COUNTIES



Both counties track well with respect to land value before the downzoning action in 1989 and after the downzoning action. Land prices experienced a larger increase at the time of the downzoning action in Kent County than did those in Queen Anne’s County, however, the statistical analysis in Appendix B finds that this difference may have occurred by chance. What is clear is that the downzoning action came at a time when market forces were pushing the land values upward for both counties. And for these two counties, land prices show a slight depression just prior to 2000, which is somewhat of a similar pattern supported by Graph 1 for Dorchester and Somerset counties.

While it appears in a few instances that the value of land in Kent County could have devalued over the land value in Queen Anne’s County (i.e. 1997, 2000 and 2001), the overall means difference is not statistically significant. In general land value increases with both counties tracking closely together. Again it does not appear that the act of downzoning reduces land value, but that perhaps market forces could have influenced the pattern for 1997, 2000 and 2001.

Talbot -Queen Anne’s Counties

Similar analyses were performed for Talbot and Queen Anne’s counties as were performed for Dorchester and Somerset and for Kent and Queen Anne’s Counties. The analyses can be found in Appendix C.

Talbot and Queen Anne’s counties were paired because market forces in Queen Anne’s County were similar to those in Talbot. Furthermore, both counties were experiencing development pressure in the rural areas along their boundaries and both jurisdictions wanted to be able to retain the agricultural and well as the rural open space nature of their counties.

In 1991, Talbot County enacted downzoning for its agricultural zones. The County went from one dwelling unit per 2 acres to one dwelling unit per 20 acres in order to preserve its agricultural lands. Queen Anne’s County enacted clustering provisions in 1987 which changed the density from one dwelling unit per acre to one dwelling unit per 8 acres with clustering on 15% of the agricultural lands.

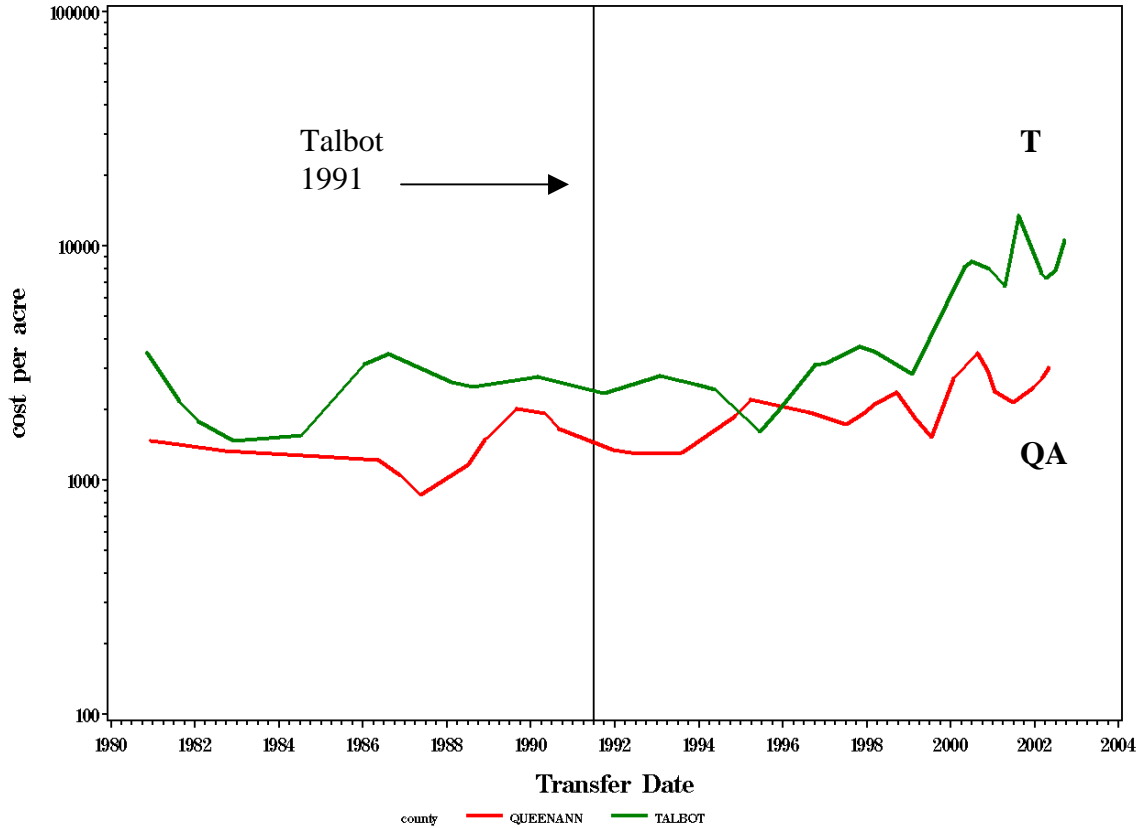
Table 3 presents the number of transactions that occurred between the 1980s and 2001 with respect to unimproved land. Talbot County had a total of 133 transactions with 46 occurring before its downzoning and 87 occurring after it enacted downzoning. Queen Anne’s County had a total of 152 transactions with 60 occurring before the downzoning action and 92 occurring afterwards. There is a different total for Queen Anne’s County in this Table (152) as compared to Table 2 (154) because the early transactions in the 1980s were “lopped off” as the downzoning action occurred two years later in Talbot County (1991) as compared to 1989 in Kent County.

TABLE 3: Transactions - Unimproved Properties: Talbot & Queen Anne’s Counties			
County	Before zoning	After zoning	Total
Talbot	46	87	133
Queen Anne’s	60	92	152
Total	106	179	285

Graph 3 presents the regression analysis for the land transactions between the counties. A comparison of the trends over time in mean land cost for Talbot and Queen Anne’s counties shows that for the period surrounding the downzoning action in Talbot County, the trends for the two counties are remarkably stable and parallel. After 1999, land cost in both counties become turbulent and start to rise. The rate of increase is greater in

Talbot than in Queen Anne’s County. This sharper increase in Talbot County is likely due to nearer proximity of urban centers. Again, as in the previous graphs, there is a dip in land value right around 1999 and this affects both the study as well as the control county. This result also appears to support the finding that downzoning has little effect on land cost.

GRAPH 3. TALBOT AND QUEEN ANNE’S COUNTIES



Calvert-Charles Counties

To reiterate, similar analyses (Before-After:Control-Impact mean cost per acre, nearest neighbor) were performed for the Calvert County-Charles County pairing. Data were retrieved from Maryland Property View 2001, and additional data were acquired from the Calvert County Department of Planning.

Calvert and Charles Counties were chosen because both were experiencing development pressure and both wanted to preserve as much agriculture and open space possible. In comparison though, Calvert County had been experiencing development pressure to a greater magnitude than Charles because of proximity to the Washington D.C./Annapolis metropolitan areas. Calvert County downzoned its Rural District 1999 from one dwelling unit per 5 acres to one dwelling unit per 10 acres because of the development pressure and because of the increase in population. Charles County changed its zoning for its rural

and agricultural zones from one dwelling unit per one acre to one dwelling unit per 3 acres, with the provision that a landowner could get one dwelling per 5 acres with clustering.

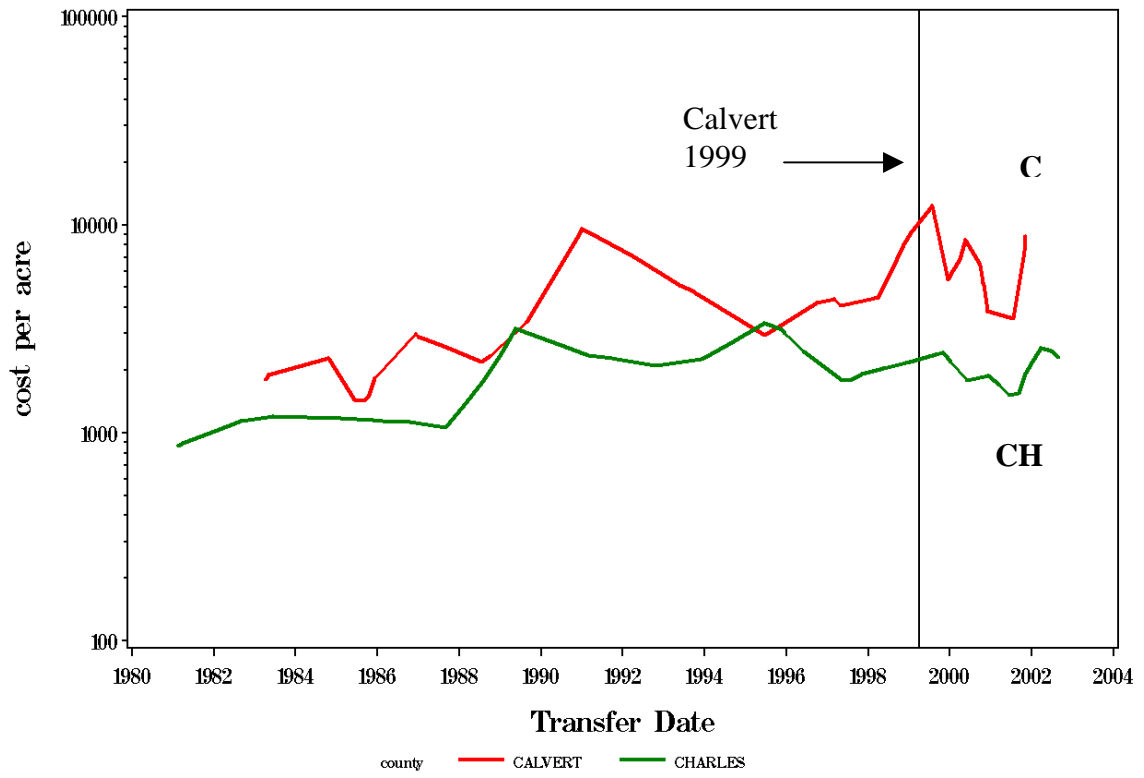
Land transactions for Calvert County totaled 67, whereas for Charles County the total number was 189. Table 4 further breaks the total numbers into transactions before downzoning and transactions after downzoning.

TABLE 4: Transactions - Unimproved Properties: Calvert & Charles Counties			
County	Before zoning	After zoning	Total
Calvert	44	23	67
Charles	127	62	189
Total	171	85	256

Taking these transactions and performing a regression analysis as to number and cost per acre, a comparison of the trends over time in the mean land cost for Calvert and Charles counties shows that during the period leading up to the downzoning action in Calvert County, Calvert County had an increasing trend in land cost while Charles County had a decreasing trend in land cost. Since the downzoning action, land costs in both counties have been relatively constant. And again, as both counties appear to track with respect to the rise and fall in land values, this result supports the finding that downzoning has little effect on land cost.

GRAPH 4. CALVERT AND CHARLES COUNTIES

loess analysis



E. Conclusions: From the Statistical Analysis

1. The general opinion that downzoning will diminish agricultural land values does not seem to be supported by the experience of five Eastern Shore and two Southern Maryland counties that have downzoned agricultural lands. When the study counties were paired with the control counties, the result of downzoning was either higher land value for the downzoned counties, or little to no appreciable effect on their land value. This conclusion is supported by two other studies (Resource Management Consultants, Inc., and the Valleys Planning Council) that were conducted in Maryland and were mentioned in this report. Altogether, the geographic areas covered by the three reports form a large part of the State and include rural, semi-rural, and suburban markets with wide differences in development pressure.

From the Literature

1. Conventional wisdom that zoning has a uniformly negative effect on land prices is untrue. It is also untrue that downzoning has a uniformly positive or neutral effect on prices in all cases. Location, market demand, trends in the local and national economy do factor into the mix.

From Local Government Insight

1. Contrary to popular perception, downzoning ordinances enacted as part of a comprehensive planning process have demonstrated that they have supported or stabilized land values, and have preserved land for long periods of time. Kent County enacted its downzoning along with a comprehensive review of its critical agricultural lands and an assessment as to where it wanted to direct growth. The one dwelling unit per 30 acres remains in tact because of this approach. Baltimore County enacted downzoning as part of a series of decision steps that began with the Urban-Rural Development Line, delineating where sewer and water would stop in order to retain the agricultural and rural character of the County. The one dwelling unit per 50 acres remains in tact as a result. Montgomery County enacted downzoning as part of its “reserve” and “wedge” comprehensive planning approach. The one dwelling unit per 25 acres remains in tact.

And in addition to these observations, in an analysis conducted by Dr. William Toner, professor of environmental planning at Governor’s State University in Chicago it was noted that almost all of the 270 local governments identified by the 1981 National Agricultural Land Study,

having agricultural zoning in place, had strengthened the provisions of their agricultural zoning ordinances to make them more effective.³³

2. While downzoning has been shown to have no impact on property values, other measures should be used as a complement to downzoning to mitigate perceived inequities between private rights and the public good. Among these measures are transferable development rights, purchase of development rights, the use of tax credits, leveraging, installment purchase agreements and State purchase and donation programs.
3. In those jurisdictions where downzoning appeared to be successful, there was development pressure occurring within the county that helped establish a value for agricultural lands as well as a base for those measures that counties enacted for the purpose of purchasing development rights. There was also a sense of urgency on the part of the public and/or the agricultural community to protect agriculture as a vital contributor to the economy of the county and/or as valued rural landscape.
4. When downzoning is employed as an integral part of a comprehensive approach to farmland protection, it is a critical and indispensable component to the success of that effort.

³³ William Toner et. al. Evaluation of Minnesota Agricultural Land Preservation Programs Governors State University, Planning Magazine. 1990. Pg. II-3.

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APPENDIX A – DORCHESTER AND SOMERSET COUNTIES

Land transactions from Maryland Property View 2001 for improved and unimproved properties yielded a resulting data set of 239 records for Dorchester County and 265 records for Somerset County. Table 1A entitled “Dorchester and Somerset Counties - Sample Sizes for Unimproved and Improved Property Transactions” presents the number of transactions. Dorchester County implemented its downzoning provision on October 30, 1996. (NOTE: The number of transactions resulted from a rigorous examination of the data as to which transactions would be included and which transactions would not be included. A description of the screening process along with the various analyses can be found in the methodology section of the main report).

Table 1A. Dorchester and Somerset Counties - Sample Sizes For Unimproved and Improved Property Transactions

County	Before Zoning	After Zoning	Total
Unimproved Properties:			
Dorchester	111	48	159
Somerset	124	77	201
Total	235	125	360
Improved Properties:			
Dorchester	56	24	80
Somerset	35	29	64
Total	91	53	144

Once the number of transactions was determined, estimates were made of the mean cost per acre derived from the transaction price obtained from Property View. (NOTE: The reader will recall that the Before-After: Control-Impact design concept was used because it enabled a comparison to be made of the land cost before and after the implementation of downzoning in the study county with the before and after land cost in the control county. The Control-Impact element of the concept also enabled a comparison of the before and after shift in the study county (the one that downzoned) to be compared to the before and after shift in the control county).

Table 2A presents the analysis of the transactions and compares the before-to-after shift for the two counties. For the unimproved property the difference is not statistically significant ($p=0.2253$) as noted on Line 7. The lines above the difference in the table provide the data supporting this conclusion. The first four lines give the estimated before and after cell means for each county. Lines 5 and 6 show that for each county, there is a small shift of land cost to the negative side with this shift being somewhat larger for Somerset County. In Somerset County the downward shift would be considered

statistically significant ($p=0.0181$). However, it is Dorchester County that enacted the downzoning provision. Thus the downzoning provision did not appear to reduce the property values in Dorchester County

The lower portion of Table 2A shows the results for improved properties. Again the conclusion is that the difference of the before-to-after shift between the two counties is not statistically significant.

Table 2A. Dorchester and Somerset Counties – Before-After: Control Impact Design - Estimates of the Mean Cost Per Acre and Standard Errors for Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost Per Acre
Unimproved Properties:					
1. Dorchester Before	3.1530	0.0459			1422
2. Dorchester After	3.0880	0.0440			1225
3. Somerset Before	3.1094	0.0501			1286
4. Somerset After	2.9606	0.0348			913
5. Dorchester Difference	-0.0649	0.0645	-1.01	0.3141	
6. Somerset Difference	-0.1489	0.0628	-2.37	0.0181	
7. County By Time Difference	0.0839	0.0691	1.21	0.2253	
Improved Properties:					
1. Dorchester Before	3.0655	0.0530			1163
2. Dorchester After	2.9627	0.0622			918
3. Somerset Before	3.0445	0.0612			1108
4. Somerset After	2.9434	0.0568			878
5. Dorchester Difference	-0.1027	0.0816	-1.26	0.2088	
6. Somerset Difference	-0.1011	0.0856	-1.18	0.2382	
7. County By Time Difference	-0.0017	0.1067	-0.02	0.9875	

Table 3A presents the “nearest neighbor” analysis. (NOTE: The reader will recall that the study team recognized that location could have an effect on the land price. To adjust for this, an ancillary analysis was developed where before and after transactions were paired using a nearest neighbor concept. The straight-line distance between the before and after zoning property transactions was computed. Properties were paired with their nearest neighbor based on distance. If a nearest neighbor had already been paired with another property because of being closer, then the second nearest neighbor was selected. Properties were paired with their nearest neighbors with the constraints that no property was used more than once, and the nearest neighbor had to be located in the same county and have the same improvement status. The pairs were then introduced to the land cost

model to adjust for spatial effects. If the paired property distance exceeded 2.5 miles, the pair was excluded from the analysis).

In Table 3A, the distances between nearest neighbor matches ranged from 0.17 miles to 5.7 miles. Seven pairs with a distance exceeding 2.5 miles were excluded from the analysis. On the whole, the results in Table 3A are remarkably similar to those in Table 2A. One difference is that the step down observed for Somerset County unimproved property is statistically significant in the analysis above but is not statistically significant in the Table 3A analysis. It is possible that the magnitude of the step down is in part due to location effects. However, this minor change of interpretation does not change the conclusion that a negative impact of downzoning on land cost has not been observed

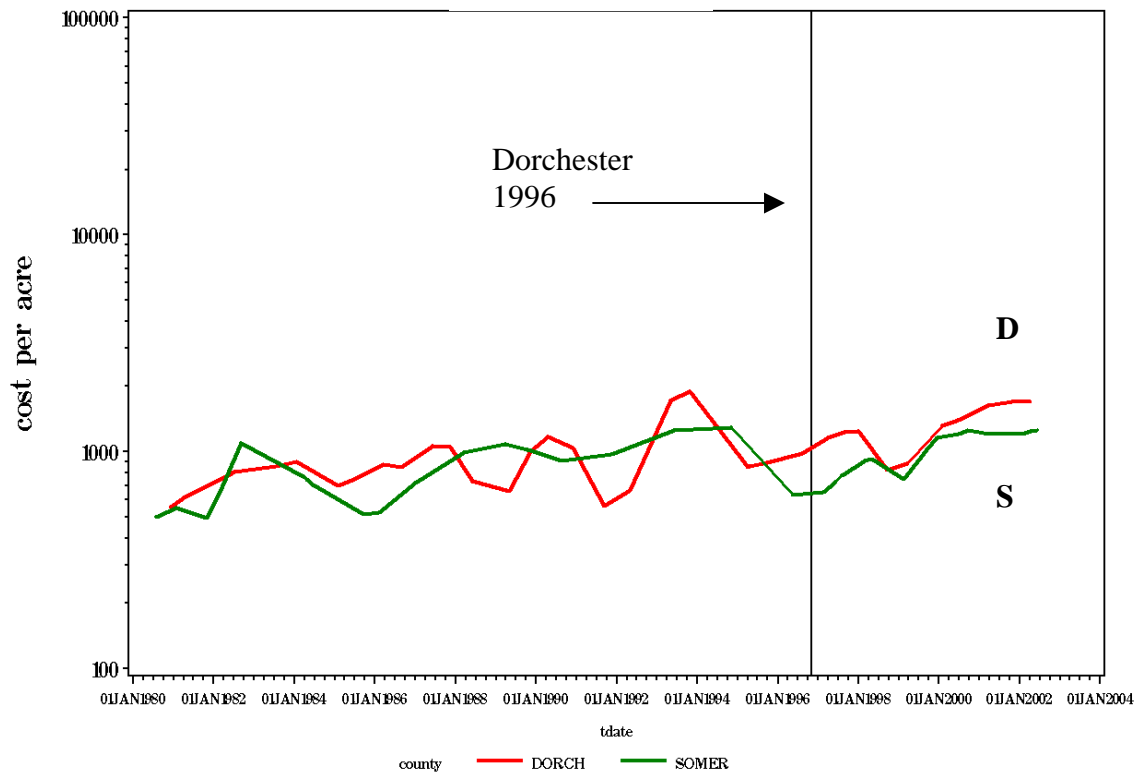
Table 3A. Dorchester and Somerset Counties - Estimates of Mean Cost Per Acre and Standard Errors For Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests Using the Nearest Neighbor Model.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost Per Acre
Unimproved Properties:					
Dorchester before	3.1016	0.0709			1264
Dorchester after	3.0943	0.0363			1243
Somerset before	3.0209	0.0788			1049
Somerset after	2.9600	0.0448			912
Dorchester difference	-0.0073	0.0831	-0.09	0.9306	
Somerset difference	-0.0609	0.0929	-0.66	0.5134	
County by time difference	0.0537	0.0817	0.66	0.5126	
Improved Properties:					
Dorchester before	3.0145	0.0732			1034
Dorchester after	2.9622	0.0483			917
Somerset before	2.9988	0.1018			997
Somerset after	2.8501	0.0753			708
Dorchester difference	-0.0523	0.0874	-0.60	0.5510	
Somerset difference	-0.1487	0.1312	-1.13	0.2598	
County by time difference	0.0964	0.1273	0.76	0.4507	

Graph 1A for Dorchester and Somerset Counties presents the LOESS Regression analysis which shows that downzoning did not cause a depression in the per/acre value of rural lands in Dorchester County, but rather illustrates that the land value tracking pattern between the study county and the control county is similar.

By the end of the period of record, property values in the two counties had achieved parity. This interpretation is not very different from that which was obtained with the statistical model: that property values in the two counties were essentially parallel.

Graph 1A: Dorchester and Somerset Counties – LOESS Regression Analysis



APPENDIX B - KENT AND QUEEN ANNE'S COUNTIES

Land transactions from Maryland Property View 2001 for improved and unimproved properties yielded a resulting data set of 108 records for Kent County and 265 records for Queen Anne's County. Table 1B entitled "Kent and Queen Anne's Counties - Sample Sizes for Unimproved and Improved Property Transactions." Presents the number of sales that occurred. Kent County implemented its downzoning provision on August 1, 1989. (NOTE: The number of transactions resulted from a rigorous examination of the data as to which transactions would be included and which transactions would not be included. A description of the screening process along with the various analyses can be found in the methodology section of the main report). With the exception of the change of zoning date and the change of counties, the data processing methods and statistical methods for the Kent and Queen Anne's analysis were the same as those employed for the Dorchester and Somerset counties analysis.

Table 1B. Kent and Queen Anne's Counties - Sample Sizes for Unimproved and Improved Property Transactions

County	Before Zoning	After Zoning	Total
Unimproved Properties:			
Kent	7	52	59
Queen Anne's	47	107	154
Total	54	159	213
Improved Properties:			
Kent	13	36	49
Queen Anne's	30	81	111
Total	43	117	160

Once the number of transactions was determined, estimates were made of the mean cost per acre derived from the transaction price obtained from Property View. (NOTE: The reader will recall that the Before-After: Control-Impact design concept was used because it enabled a comparison to be made of the land cost before and after the implementation of downzoning in the study county with the before and after land cost in the control county. The Control-Impact element of the concept also enabled a comparison of the before and after shift in the study county (the one that downzoned) to be compared to the before and after shift in the control county).

Table 2B presents the analysis of the transactions and compares the before-to-after shift for the two counties. Line 7 in each part of the table addresses the hypothesis: Is the before-to-after shift for the two counties equal? The remaining lines in the table give the data supporting this conclusion. The first four lines give the estimated before and after cell means for each county. Lines 5 and 6 show change in land value by county between the two zoning periods.

For unimproved property, the county by time difference is not statistically significant ($p=0.4565$). Both counties show an increase in value between the two periods. In Kent County the estimated increase is 29 percent, while in Queen Anne's County the estimated increase is 6.4 percent. These estimated increases are over and above the normal increase of land values estimated as 3.5 percent per year for these data. Compared to the normal variability of land cost data, the difference between 29 percent and 6.4 percent is not unlikely to occur by chance.

For improved property, there is weak evidence that the county by time difference is statistically significant ($p=0.0581$). The Kent County estimates show a decrease of 8.3 percent in value between the two periods, which is not statistically significant ($p=0.7171$). The Queen Anne's County estimates show an increase of 42 percent ($p=0.0304$), which we interpret as weak evidence that the effect is greater than would occur by chance. This difference between the two counties of a step down of 8.3 percent in Kent compared to a step up of 42 percent in Queen Anne's is also sufficiently large that it is unlikely to occur by chance ($p=0.0581$). Thus taking the data at face value, there is weak evidence that land value in Queen Anne's increased more than the land value in Kent. However, recall that calculation of land cost for improved property involves the assessment for improvements. Any change in assessment methods or personnel that occurred about the same time as the zoning change would create an artifact in the data. Therefore it may be unwise to interpret the data at face value.

Table 2B. Kent and Queen Anne’s Counties – Before-After: Control Impact Design - Estimates of the Mean Cost Per Acre and Standard Errors for Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost per Acre
Unimproved Properties					
Kent Before	3.3968	0.1053			2493
Kent After	3.5063	0.0351			3208
Queen Anne’s Before	3.304	0.0611			2014
Queen Anne’s After	3.3311	0.0251			2143
Kent Difference	0.1095	0.1095	1	0.3181	
Queen Anne’s Difference	0.027	0.0614	0.44	0.6598	
County By Time Difference	0.0824	0.1106	0.75	0.4565	
Improved Properties					
Kent Before	3.3403	0.0885			2189
Kent After	3.3056	0.0422			2021
Queen Anne’s Before	3.0948	0.0683			1244
Queen Anne’s After	3.2461	0.0287			1762
Kent Difference	-0.0346	0.0956	-0.36	0.7171	
Queen Anne’s Difference	0.1513	0.0696	2.17	0.0304	
County By Time Difference	-0.186	0.0979	-1.9	0.0581	

Table 3B presents the nearest neighbor analysis. (NOTE: The reader will recall that the study team recognized that location could have an effect on the land price. To adjust for this, an ancillary analysis was developed where before and after transactions were paired using a nearest neighbor concept. The straight-line distance between the before and after zoning property transactions was computed. Properties were paired with their nearest neighbor based on distance. If a nearest neighbor had already been paired with another property because of being closer, then the second nearest neighbor was selected. Properties were paired with their nearest neighbors with the constraints that no property was used more than once, and the nearest neighbor had to be located in the same county and have the same improvement status. The pairs were then introduced to the land cost model to adjust for spatial effects. If the paired property distance exceeded 2.5 miles, the pair was excluded from the analysis).

The analysis, which uses nearest neighbor pairing to remove spatial effects in the data, shows the same results as the analysis given above. For the unimproved property, it appears that at the time of the zoning change, land cost increased somewhat more in Kent

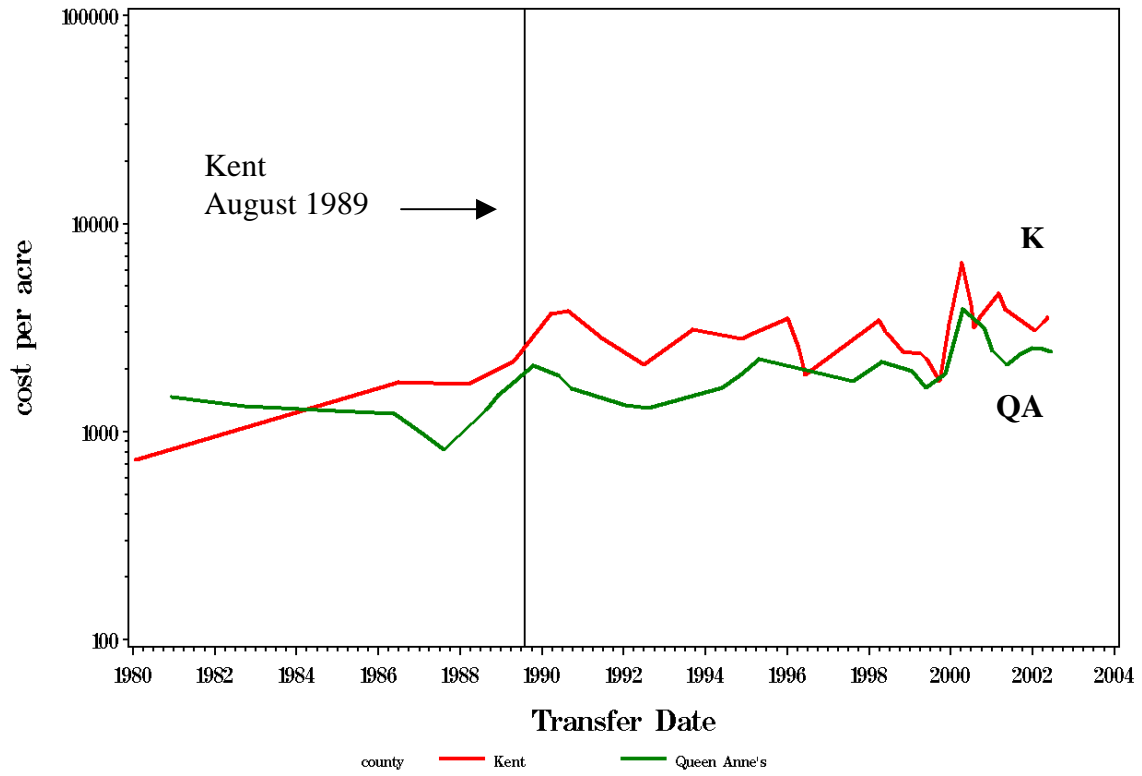
County than in Queen Anne’s County, but the difference is not statistically significant (p=0.4842). For the improved property, the data show that land cost in Kent County experienced a slight set back while land cost in Queen Anne’s increased. The difference between these two effects is statistically significant (p=0.0096).

Table 3B. Kent and Queen Anne’s Counties -Estimates of Mean Cost Per Acre and Standard Errors For Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests Using the Nearest Neighbor Model

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost per Acre
Unimproved Properties					
Kent before	3.249	0.1			1774
Kent after	3.3746	0.1193			2369
Queen Anne’s before	3.1614	0.0494			1450
Queen Anne’s after	3.1827	0.0748			1523
Kent difference	0.1255	0.1646	0.76	0.4478	
Queen Anne’s difference	0.0213	0.1092	0.2	0.8457	
County by time difference	0.1042	0.149	0.7	0.4862	
Improved Properties					
Kent before	3.1852	0.0986			1532
Kent after	3.005	0.1136			1012
Queen Anne’s before	2.9427	0.0576			876
Queen Anne’s after	3.135	0.0832			1365
Kent difference	-0.1801	0.1724	-1.05	0.299	
Queen Anne’s difference	0.1923	0.1216	1.58	0.1176	
County by time difference	-0.3724	0.1405	-2.65	0.0096	

Graph 1B for Kent and Queen Anne’s Counties presents the LOESS Regression analysis which shows that the downzoning action did not appear to cause a depression in the per/acre value of rural lands in Kent County, but rather illustrates that the land value tracking pattern between the study county and the control county is similar. The vertical line denotes when the downzoning measure was enacted in Kent County. Land prices in Kent County experienced a larger increase at the time of the zoning action than did those in Queen Anne’s. Recall that our statistical analysis found that this difference might have occurred by chance. It is clear that the zoning action came at a time when market forces were pushing the land values in both counties upward. Note that for these two counties, land prices show a slight depression just prior to 2000, which helps to confirm that the occurrence of this phenomenon in plots for other counties was not a fluke.

Graph 1B- Kent and Queen Anne's Counties- LOESS Regression Analysis



APPENDIX C – TALBOT AND QUEEN ANNE’S COUNTIES

Land transactions from Maryland Property View 2001 for improved and unimproved properties yielded a resulting data set of 245 records for Talbot County and 260 records for Queen Anne’s County. Table 1C entitled Talbot and Queen Anne’s Counties – Sample Sizes for Unimproved and Improved Property Transactions” presents the number of transactions. Talbot County implemented downzoning on June 22, 1991. (NOTE: The number of transactions resulted from a rigorous examination of the data as to which transactions would be included and which transactions would not be included. A description of the screening process along with the various analyses can be found in the methodology section of the main report). With the exception of the change of zoning date and the change of a county, the data processing methods and statistical methods for the Talbot-Queen Anne’s analysis were the same as those employed for the two previous analyses.

Table 1C – Talbot and Queen Anne’s Counties -Sample Sizes For Unimproved and Improved Property Transactions

County	Before Zoning	After Zoning	Total
Unimproved Properties:			
Talbot	46	87	133
Queen Anne’s	60	92	152
Total	106	179	285
Improved Properties:			
Talbot	33	79	112
Queen Anne’s	37	71	108
Total	70	150	220

Once the number of transactions was determined, estimates were made of the mean cost per acre derived from the transaction price obtained from Property View. (NOTE: The reader will recall that the Before-After: Control-Impact design concept was used because it enabled a comparison to be made of the land cost before and after the implementation of downzoning in the study county with the before and after land cost in the control county. The Control-Impact element of the concept also enabled a comparison of the before and after shift in the study county (the one that downzoned) to be compared to the before and after shift in the control county).

It was unfortunate that the results of the quality control checks on the data showed that the data from Talbot County were not of as good quality as we had found for Somerset, Dorchester, Kent and Queen Anne’s Counties. There were six properties that were part of multiple property transfers that were not coded correctly in the data. They were removed before the analysis was performed. Numerous properties had inconsistent

information for the year that a house was built, for improvement assessments, and with the code for the property being improved at the time of the sale. A further examination of the very high cost properties using a GIS system was performed and it was found that many of the properties were waterfront (or at least in the Critical Area), even though this was not properly coded in the data. Even though the results shown by the Talbot-Queen Anne's comparison are consistent with the results from the previous comparisons, the study team felt that the results could be tainted by the lack of data quality from Talbot County.

Table 2C presents the analysis of the transactions and compares the before-to-after shift for the two counties. The last line of the table addresses the bottom line hypothesis: Is the before-to-after shift for the two counties equal? In this case we conclude that the difference is not statistically significant ($p=0.5788$). The remaining lines in the table give the data supporting this conclusion. The first four lines give the estimated before and after cell means for each county. Lines 5 and 6 show that for each county, there is a small shift of land value downwards at the time of the downzoning. This shift is somewhat larger in Queen Anne's County than in Talbot County, and in Queen Anne's County, the shift is statistically significant ($p=0.0435$). From the standard error of the County by time difference we conclude that the variability in the data would permit the statistical detection of about 50% difference between the counties.

Table 2C. Talbot and Queen Anne’s Counties – Before-After: Control-Impact Design - Estimates of Mean Cost Per Acre and Standard Errors For Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost Per Acre
Unimproved Properties:					
Talbot Before	3.7955	0.0926	41.00	<.0001	6245
Talbot After	3.6702	0.0402	91.37	<.0001	4680
Queen Anne's Before	3.5232	0.0813	43.32	<.0001	3336
Queen Anne's After	3.3464	0.0392	85.39	<.0001	2220
Talbot Difference	-0.1253	0.0991	-1.26	0.2069	
Queen Anne's Difference	-0.1768	0.0874	-2.02	0.0435	
County By Time Difference	0.0515	0.0928	0.56	0.5788	
Improved Properties:					
Talbot Before	3.6834	0.0967	38.10	<.0001	4824
Talbot After	3.5179	0.0425	82.75	<.0001	3295
Queen Anne's Before	3.3607	0.0920	36.52	<.0001	2295
Queen Anne's After	3.2509	0.0449	72.46	<.0001	1782
Talbot Difference	-0.1654	0.1014	-1.63	0.1035	
Queen Anne's Difference	-0.1097	0.0979	-1.12	0.2628	
County By Time Difference	-0.0557	0.1085	-0.51	0.6080	

Between the improved and the unimproved properties, the bottom line conclusion is that the difference of the before-to-after shift between the two counties is not statistically significant ($p=0.6080$). The results supporting this conclusion are quite similar for the improved properties, except that the downward shift in Queen Anne’s County does not appear significant for improved property.

Table 3C presents the “nearest neighbor” analysis. (NOTE: The reader will recall that the study team recognized that location could have an effect on land price. To adjust for this, an ancillary analysis was developed where before and after transactions were paired using a nearest neighbor concept. The straight-line distance between the before and after zoning property transactions was computed. Properties were paired with their nearest neighbor based on distance. If a nearest neighbor had already been paired with another property because of being closer, then the second nearest neighbor was selected. Properties were paired with their nearest neighbors with the constraints that no property was used more than once, and the nearest neighbor had to be located in the same county and have the same improvement status. The pairs were then introduced to the land cost

model to adjust for spatial effects. If the paired property distance exceeded 2.5 miles, the pair was excluded from the analysis.

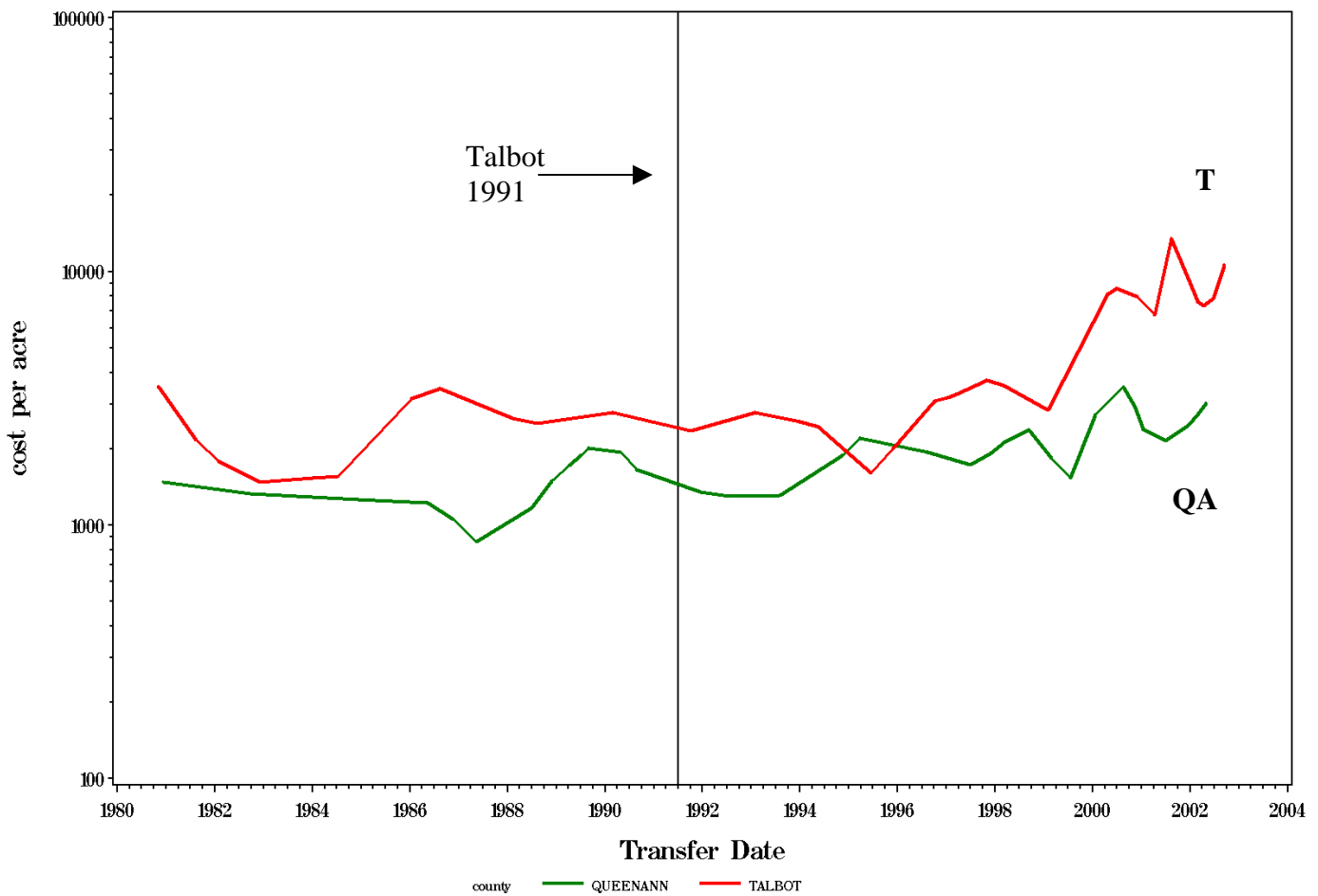
The distances between nearest neighbor matches ranged from 11 yards to 6.0 miles. Seventeen pairs with a distance exceeding 2.5 miles were excluded from the analysis. For unimproved properties in Table 3C the results are remarkably similar to those in Table 2C. Thus it seems that accounting for location effects of unimproved land cost does not change the conclusion that downzoning has no effect. For the improved properties in Table 3C, we see a significant county by zoning action effect ($p=0.0072$). The nature of this effect suggests that land cost of improved properties decreased more in Talbot County at the time of downzoning than did similar land in Queen Anne’s County. This might be interpreted as a negative downzoning effect, however, this effect is not consistent with the unimproved property and the finding is not consistent with the non-paired analysis. Given our uncertainty with the adjustment for improvements, it is not wise to give this finding strong credibility.

Table 3C. Talbot and Queen Anne’s Counties - Nearest Neighbor Model – Estimates of Mean Cost Per Acre and Standard Errors For Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests Using Nearest Neighbor Model.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost per acre
Unimproved Properties					
Talbot Before	3.7819	0.1121	33.73	<.0001	6052
Talbot After	3.6413	0.0485	75.15	<.0001	4378
Queen Anne's Before	3.5523	0.0994	35.74	<.0001	3567
Queen Anne's After	3.3262	0.0421	79.04	<.0001	2119
Talbot Difference	-0.1406	0.1140	-1.23	0.2193	
Queen Anne's Difference	-0.2261	0.1014	-2.23	0.0273	
County by time difference	0.0855	0.0896	0.95	0.3416	
Improved Properties					
Talbot Before	3.7212	0.1140	32.65	<.0001	5263
Talbot After	3.2907	0.0569	57.81	<.0001	1953
Queen Anne's Before	3.3653	0.1089	30.91	<.0001	2319
Queen Anne's After	3.2286	0.0528	61.10	<.0001	1693
Talbot Difference	-0.4305	0.1173	-3.67	0.0003	
Queen Anne's Difference	-0.1367	0.1143	-1.20	0.2335	
County by time difference	-0.2938	0.1078	-2.73	0.0072	

Graph 1C is a comparison of the trends over time in the mean land cost for Talbot and Queen Anne’s Counties. Graph 1C shows that for the period surrounding the downzoning action in Talbot County, the trends for the two counties are remarkably stable and parallel. This result supports the finding that downzoning has little effect on land cost. After 1999, land cost in both counties become turbulent and start to rise. The rate of increase is greater in Talbot County than in Queen Anne’s County. This sharper increase in Talbot County is likely due to nearer proximity of urban centers. However, the fact that the County had been downzoned did not impede this rapid increase.

Graph 1C: Talbot and Queen Anne’s Counties – LOESS Regression Analysis



APPENDIX D – CALVERT AND CHARLES COUNTIES

Data were retrieved from Property View 2001 using the methods described above. However, additional data were acquired from the Calvert County Department of Planning from two databases. One database included all properties in Agricultural Preservation Districts (APD data) and the other included property transactions since 1998 where a single large property (one that resulted in more than 10 lots) was divided and platted while in the name of the seller and the sale was recorded as individual lots.

The resulting data set was 109 records for Calvert County and 334 records for Charles County. Calvert County enacted its downzoning in April 1999. Table 1D entitled “Calvert and Charles Counties - Sample Sizes for Unimproved and Improved Property Transactions” presents the records. (NOTE: The number of transactions resulted from a rigorous examination of the data as to which transactions would be included and which transactions would not be included. A description of the screening process along with the various analyses can be found in the methodology section of the main report).

Table 1D. Calvert and Charles Counties – Sample Sizes For Unimproved and Improved Property Transactions

County	Before Zoning	After Zoning	Total
Unimproved Properties			
Calvert	44	23	67
Charles	127	62	189
Total	171	85	256
Improved Properties:			
Calvert	37	5	42
Charles	97	48	145
Total	134	53	187

Once the number of transactions was determined, estimates were made of the mean cost per acre derived from the transaction price obtained from Property View. (NOTE: The reader will recall that the Before-After: Control-Impact design concept was used because it enabled a comparison to be made of the land cost before and after the implementation of downzoning in the study county with the before and after land cost in the control county. The Control-Impact element of the concept also enabled a comparison of the before and after shift in the study county (the one that downzoned) to be compared to the before and after shift in the control county).

The last line of Table 2D for unimproved properties addresses the bottom line hypothesis: Is the before-to-after shift for the two counties equal? In this case, we conclude that the

difference is (just barely) statistically significant ($p=0.0322$). The result implies that the change of land cost was not the same for the two counties at the time of downzoning in Calvert County. The remaining lines in the table give the data supporting this conclusion. The first four lines give the estimated before and after cell means for each county. Line 5 shows that in Calvert County, there was a slight shift toward higher land cost that is not significantly different from zero ($p=0.5937$). Line 6 shows that in Charles County there was a shift toward lower land cost that is statistically significant ($p=0.0095$). Thus we infer that Charles County had a larger downward shift than Calvert at the time of downzoning. From the standard error of the county by time difference we conclude that the variability in the data would permit the statistical detection of about 60% difference between the counties.

The portion of the table that shows the results for improved properties is analogous to the portion for the unimproved. These data show that neither county had a significant change in land cost and that the difference of the before-to after shift between the two counties is not statistically significant ($p=0.7796$). Both counties have higher land value after the zoning action. The change in Calvert is larger than the change in Charles, but the difference between the two is not statistically significant.

Table 2D. Calvert and Charles Counties – Before-After: Control Impact Design – Estimates of the Mean Cost Per Acre and Standard Errors for Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	Cost Per Acre
Unimproved Properties:					
Calvert Before	3.7168	0.0570	65.18	<. 0001	5209.55
Calvert After	3.7659	0.0701	53.71	<. 0001	5833.11
Charles Before	3.4333	0.0423	81.25	<. 0001	2712.06
Charles After	3.2684	0.0422	77.36	<. 0001	1855.24
Calvert Difference	0.0491	0.0920	0.53	0.5937	
Charles Difference	-0.1650	0.0633	-2.61	0.0095	
County By Time Difference	0.2141	0.0997	2.15	0.0322	
Improved Properties:					
Calvert Before	3.5240	0.0632	55.74	<. 0001	3341.95
Calvert After	3.5868	0.1467	24.45	<. 0001	3861.89
Charles Before	3.3036	0.0442	64.75	<. 0001	2011.87
Charles After	3.3198	0.0477	69.55	<. 0001	2088.33
Calvert Difference	0.0628	0.1602	0.39	0.6952	
Charles Difference	0.0161	0.0677	0.24	0.812	
County By Time Difference	0.0467	0.1666	0.28	0.7796	

Table 3D presents the “nearest neighbor” analysis. (NOTE: The reader will recall that the study team recognized that location could have an effect on the land price. To adjust for this, an ancillary analysis was developed where before and after transactions were paired using a nearest neighbor concept. The straight-line distance between the before and after zoning property transactions was computed. Properties were paired with their nearest neighbor based on distance. If a nearest neighbor had already been paired with another property because of being closer, then the second nearest neighbor was selected. Properties were paired with their nearest neighbors with the constraints that no property was used more than once, and the nearest neighbor had to be located in the same county and have the same improvement status. The pairs were then introduced to the land cost model to adjust for spatial effects. If the paired property distance exceeded 2.5 miles, the pair was excluded from the analysis).

Table 3D shows results analogous to Table 2D. The distances between nearest neighbor matches ranged from 0 meters (same property sold before and after) to 24316 meters (15.2 miles). Twenty-two pairs with a distance exceeding 4000 meters (2.5 miles) were excluded from the analysis. Nearest neighbor results for unimproved property differ from the unimproved property results without the nearest neighbor adjustment. With the nearest neighbor model, the change of land cost at the time of downzoning does not differ significantly between the two counties. From comparing these analyses, it can be inferred that the post zoning downward shift in land cost in Calvert County had been mediated by a shift in land sales toward a region of the County with higher land value. When this region shift is removed by comparing land values in similar regions based on nearest neighbors, we no longer find a difference in land value trends.

The nearest neighbor analysis results for improved properties differ slightly from the results for unimproved property. Calvert County shows a slight increase while Charles County shows a slight decrease for improved property land value. This difference between the counties is not statistically significant ($p=0.4461$).

Table 3D-Calvert and Charles Counties –Estimates of Mean Cost Per Acre and Standard Errors For Each Cell of the BACI Design and Estimates of Cell Differences With Hypothesis Tests Using the Nearest Neighbor Model.

Dependent Variable: Log (cost/acre)					
BACI design cell or difference	Logarithm Estimate	Logarithm Standard Error	t Value	p-value	cost per acre
Unimproved Properties					
Calvert Before	3.7011	0.1783	20.76	<. 0001	5024.58
Calvert After	3.6281	0.1386	26.17	<. 0001	4247.17
Charles Before	3.5246	0.1045	33.72	<. 0001	3346.57
Charles After	3.2507	0.0549	59.22	<. 0001	1781.15
Calvert Difference	-0.0730	0.2322	-0.31	0.7539	
Charles Difference	-0.2739	0.1320	-2.08	0.0404	
County By Time Difference	0.2009	0.2318	0.87	0.3881	
Improved Properties					
Calvert Before	3.4592	0.2073	16.68	<. 0001	2878.72
Calvert After	3.5506	0.1972	18.01	<. 0001	3553.04
Charles Before	3.4042	0.0971	35.05	<. 0001	2536.30
Charles After	3.2740	-.0557	58.81	<. 0001	1879.32
Calvert Difference	0.0914	0.2879	0.32	0.7515	
Charles Difference	-0.1301	0.1231	-1.06	0.2927	
County By Time Difference	0.2216	0.2897	0.76	0.4461	

The Loess regression results are presented in Graph 1D. In Calvert County, land cost surged upward in the mid-1980s and then assumed a downward trajectory until the mid 1990's. In the mid 1990's the downward trend reversed and prices have generally increased since with some turbulence in recent years. The downzoning action occurred near the end of the upward trend in the mid 1990's. While the trend line indicates some turbulence, land costs have remained relatively constant since the downzoning action. Recall also the discussion above that suggests that the slight post zoning increase in Calvert County may in part be due to a shift of land sales to a more expensive region in the County. Note that the land sale records for Calvert County are relatively sparse.

In Charles County, like Calvert County, land cost increased through much of the 1980's. Land prices were relatively stable for a period in the early 1990's and then began to decrease. In recent years it appears that land costs are rising again.

A comparison of the trends over time in mean land cost for Calvert and Charles Counties shows that during the period leading up to the downzoning action in Calvert County, Calvert County had an increasing trend in land cost while Charles County had a decreasing trend in land cost. Since the downzoning action land costs in both counties have been relatively constant. This result supports the finding that downzoning has little effect on land cost.

Graph 1D. Calvert and Charles Counties- LOESS Regression Analysis

