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WHERE IS TDR WORKING AND HOW WOULD WE KNOW:
RESULTS FROM A NATIONWIDE STUDY OF TDR PROGRAM
COMPONENTS AND OUTCOMES

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ABSTRACT

WHERE IS TDR WORKING AND HOW WOULD WE KNOW:
RESULTS FROM A NATIONWIDE STUDY OF TDR PROGRAM COMPONENTS
AND OUTCOMES

By

Matthew Henson Brinkley

Although *transfer of development rights* or *transferable development rights* (or TDR as it will be referred to throughout this study) was developed nearly 40 years ago, it has recently become a topic of greater interest among planners, members of the development and conservation communities, citizens, and scholars. As many as 181 TDR programs may exist in some sense as laws or regulations that have been formally adopted by legislative and administrative entities, but the program features and performance of many them remain largely unknown. Relatively few comprehensive, empirical investigations of TDR have ever been conducted. Current empirical research has had much to say about individual programs and very small samples of individual programs, and little to say about the performance and viability of TDR in a broader sense. Based primarily on data from recent interviews with program administrators representing TDR programs from across the United States, this study establishes several indicators for measuring TDR program performance and analyzes core TDR program factors including mandatory versus voluntary programs; programs with TDR banks; public involvement in implementing TDR; programmatic goals of TDR programs. Implications for further research and policy are discussed.

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1 Introduction

This chapter describes the historical development of TDR as a technique for land preservation and other urban and regional planning objectives. Key components of TDR programs are identified and defined, and issues related to these components are discussed in general terms. The author introduces theoretical concepts related to TDR, and concludes with a brief discussion of the current state of the TDR programs.

1.1 History

Although *transfer of development rights* or *transferable development rights* (or TDR as it will be referred to throughout this study) was developed nearly 40 years ago, it has recently become a topic of greater interest among planners, members of the development and conservation communities, citizens, and scholars.

Johnson and Madison (1997) suggest that some of the recent interest in TDR emanates from recent legal decisions and a political environment that are increasingly hostile toward land use regulations that adversely affect property values of regulated lands. In a legal environment where courts are more likely to uphold the primacy of private property rights over land use regulation that serve the public interest, local governments have a tremendous incentive to find policy solutions that "make such noncompensable regulations partly or wholly compensable" (p. 365). For local governments concerned with avoiding takings claims, and protecting the equity of landowners while preserving an array of public amenities, TDR would seem an attractive approach to resolving conflicts between these goals. Indeed, anecdotal evidence and limited empirical research suggest that TDR can avoid "complete wipeouts" of land values for owners of regulated lands (Beaton 1991), and case studies of a limited number of venerated TDR programs document impressive gains made in the preservation of agricultural and environmentally significant/sensitive land.

The recent increase in the number of programs should not be interpreted as an acknowledgement of the practice's ascendancy, but as an acknowledgement of its appeal relative to other programs and their deficiencies. TDR is not always seen as a perfect solution to the many dilemmas involved in protecting land from development, but as the only alternative to approaches that may be untenable. Pizor (1986) summarizes common motivations for implementing TDR in a 1986 study of TDR in Montgomery County, Maryland and the New Jersey Pinelands: purchase of development rights or fee interest can be too expensive, and restrictive downzoning can be unfair to landowners. More than merely relieving property owners of regulatory burden and ensuing lost economic value, some of the appeal surrounding TDR lies in the perception that it can transform such conditions into opportunities for progress. Barrese (1983) avers that TDR and similar programs have become more popular due to the belief that changes in land values affected by regulation can be used to "achieve positive goals" (p. 235).

Originally designed to compensate landowners who were restricted from redeveloping historically significant sites in New York City, TDR programs have evolved to address different development issues in very different development contexts (Pruetz 2007 and 2003; American Farmland Trust, 2001; Johnston and Madison, 1997). Pruetz (2007) identifies 5 distinct areas where TDR is currently used: environmental protection, farmland preservation, historic preservation, community revitalization, and economic development. While some of these goal areas overlap in some programs (Montgomery County's agricultural preservation program is housed within the economic development division), they do describe distinct sets of goals commonly found among TDR programs.

From the most urbanized and densely populated regions in the United States, TDR has been reinterpreted to meet the needs of rural and urban communities throughout the United States. As more rural communities face increasing development pressures and existing natural and working landscapes become ever more threatened by urbanization, the search for innovative land management techniques has led many of them to TDR. Brabec and Smith (2002) included TDR in a set of "three dominant" land use tools used to preserve agricultural land. Scanning recent studies, it becomes apparent that many of greatest TDR successes have been achieved in the context of agricultural preservation in rural and developing communities (McConnell, Kopits, and Walls 2003; Kopits, McConnell and Walls 2005; Brabec and Smith 2002; Machemer and Kaplowitz 2003; American Farmland Trust, 2001). McConnell and Walls (2007) suggest that although TDR can theoretically be used to achieve a variety of goals, throughout much of its history TDR has primarily been used to protect agricultural land and open space.

This may be changing for many rural communities on the urban fringe. Pruetz (2003) identified a growing number of programs devoted not only to the preservation of agricultural land and open space, but to the protection of environmentally sensitive and unique lands. Even programs that were originally designed as farmland preservation strategies have grown to include environmental concerns that are unrelated to original program goals. Even programs that have not yet directly espoused environmental goals may be capable of addressing land use related issues. Walls et al. (2004) consider the effects of land use patterns and market-based land use policies on the pollution in the Chesapeake Bay. Comparing purchase of development rights (PDR), TDR, and development impact fees the researchers conclude that TDR could be used to reduce

pollution by reducing the amount of land surrounding the Chesapeake Bay that might otherwise be converted to higher intensity urban uses. With such flexibility, it would seem that TDR can be adapted to address any number of land use challenges.

Development rights markets have not only evolved to address new landscapes, they have also been used to redefine how communities are planned. Ezio (2002) investigated the use of development rights approaches in land use planning in Italy. Municipalities there have used development rights markets to address externalities in much the same way that governments around the world have experimented (somewhat successfully) with external markets to protect the environment. In describing the procedures through which development rights are created and marketed, it becomes apparent that development rights markets in Italy play a role that is more central to land use planning than in the United States where TDR is often grafted onto existing regulations and comprehensive land use plans. To begin with, the development rights trading schemes discussed in this study are usually not concerned with protecting a particular class of land use. Rather, they are concerned more with improving the allocation of land for various uses. While the difference between this and the understanding of transferable development rights common in the United States may seem merely a matter of degree, the distinction goes further: the development rights markets in Italy are used as a tool for comprehensive planning and not just as tools that supplement regulatory approaches and/or correct inequalities caused by them. The goal of this system is to ensure an allocation of rights such that the legal classification of land coincides with its economic attributes, and costs and benefits of land use planning and regulation are shared throughout a community between private and public parties. TDR in the United States is often an ancillary

technique used to achieve relatively narrow objectives. In Italy property rights markets compensates landowners **so that** public land use planning may take place in a coherent, comprehensive, non-ad hoc manner. The idea is not merely to secure a certain outcome for one classification of land (for example preserving agricultural land on the urban fringe) but to obtain equitable outcomes across land uses and throughout the geographic extent of a given regulatory regime or unit of government. So protecting open space on the urban fringe by assembling land for a "green belt" is not only a means to preserve open space, but also a part of an effort to redevelop existing urban land that has fallen into disuse or obsolescence. In the United States, TDR is seldom designed or conceived of as a comprehensive planning tool that addresses urban and rural land use issues simultaneously. Though it is beyond the scope of the research presented here, anecdotal evidence gleaned from interviewing administrators of TDR programs across the United States suggests that TDR needs to be understood in a more wholistic manner—as an instrument of land use policy capable of addressing the challenges of disparate urban and rural landscapes and an instrument that can be more effective when it is used in such a way.

Although the practice was first implemented in New York City in 1968, the number of TDR programs operating in urban areas today is relatively small when compared alongside the number programs attempting to preserve agricultural and environmentally sensitive lands, natural resources, and open space. As discussed in greater detail below, many urban TDR programs continue to focus on the preservation of historical resources. But several urban programs have found new applications for development rights. Such is the case for Clearwater, Florida where TDR has been applied to achieve economic

development goals, and Portland Oregon where TDR works to incentivize practices like preservation of urban open space and the preservation of historic structures.

1.2 Program components

TDR has been used in different communities for many different purposes, and the means by which these programs have been implemented varies accordingly. Several researchers have suggested that such variability is evidence of the flexibility of TDR as a land use tool (Pruetz 2003). Research has nevertheless been interested to identify practices common to development rights and similar programs—particularly the practices and programmatic characteristics that make some programs succeed and others fail. The following presents a general discussion of components common to many programs.

Sending areas

As discussed above, most TDR programs work to preserve or protect land or some other spatially defined resource (e.g. an historically significant building). These resources are often defined spatially as occupying or being located in a geographic area or zone known as a sending area. Development rights are removed from sending areas and "sent" to receiving areas where they can be used. Once development rights are removed, those rights can no longer be used in the sending area and the land or building from they were removed can no longer be developed as it might have been before the transfer.

Different programs do operate in different ways and in very different geographic and policy contexts and the operation and the definition of sending areas can vary greatly. Machemer and Kaplowitz (2002) observe that TDR can be designed to facilitate or direct transfers of rights between (1) adjacent parcels, (2) within a designated district, (3) from

non-urban to urban areas within a jurisdiction, or (4) from non-urban to urban areas within a region between jurisdictions. Despite these variations, transfers falling into the last 2 categories are more prevalent precisely because most TDR programs address environmental and other land conservation issues (p. 776).

Researchers argue that sending area characteristics and the way sending areas are selected can influence program success. Pruetz (2007) suggests that sending areas 1) should not be in the direct path of development, 2) should have necessary urban infrastructure in place, and 3) should be identified as preservation areas within a comprehensive plan. Some TDR programs do not differentiate between sending and receiving areas, allowing development rights to be transferred between parcels in immediate proximity to one another, and between parcels with the same characteristics. In one such case McConnell et al. (2003) find that the program has successfully preserved agricultural land. In any case, finding viable sending areas can be difficult in communities where agricultural land has already become fragmented (American Farmland Trust, 2001), and building support among sending area landowners is important for program success (Pruetz, 2003; Machemer and Kaplowitz, 2002).

Receiving areas

Development rights "sent" from sending areas are used or converted into development in receiving areas. Some researchers contend that effective siting of receiving areas is even more important than the siting of sending areas because demand for development rights emanates from receiving areas. At least one writer on the subject contends that selecting viable receiving areas is the most difficult aspect of designing a TDR program (Tustian, 1983).

Demand for development in receiving areas makes the market for development rights or in the words of Richard Tustian "the economic value of transferable development rights is conditioned, not by where they transfer from, but by where they transfer to" (p. 67). Reflecting on TDR successes in Montgomery County, Maryland, Pizor (1986) argues that the ability or opportunity to achieve higher densities in receiving areas is "the linchpin" of TDR (p. 209). Demand must exist for higher intensity/density development (usually residential) and that intensity/density must be able to be accommodated physically, socially, and politically.

Not all receiving areas are created equal, and some programs probably succeed because demand in receiving areas achieves some kind of equilibrium with the supply of development rights transferred from sending areas. Conversely, some programs likely suffer from poorly selected or designed receiving areas that fail to generate demand for development rights. The imbalance of supply and demand can cause development rights markets and programs to fail (McConnell, 2003; Thorsnes and Simon, 1999; Barrese, 1983). Some of the root causes—anomalies in local real estate markets for instance—are beyond the grasp of program administrators to correct through the alteration of program features. But Pruetz (2007, 2003) emphasizes that program design, and in this case the selection of receiving areas and the structuring of incentives, influences program success. Among other things, Pruetz recommends that receiving areas be located close to existing urban amenities and services; that baseline zoning remain (or become) low enough in receiving areas for developers to benefit from the acquisition and use of development rights; that means of circumventing TDR be removed. TDR should be the only means of adding density beyond that allowed by right at receiver sites. Finally, profitability is a

factor that motivates both sellers and buyers of TDRs, and understanding market forces that determine profitability for both parties should be a priority for communities implementing TDR. Finding a balance between the developers' and landowners' profit expectations can help communities derive transfer ratios that incentivize the purchase and sale of development rights.

TDR transactions

As will be shown in much greater detail throughout this study, TDR has come to be used in many different contexts, and programs have been fitted to unique circumstances accordingly. In its most basic formulation, however, a TDR transaction proceeds as follows:

1. A landowner severs the right to develop her land rather than selling the land outright to a developer or land speculator. This action is recorded at some point during the transaction and runs with the land into perpetuity—usually.
2. A party interested in developing land elsewhere purchases the severed development right(s) and uses them to develop at greater density (in the case of residential land uses) or intensity (in the case of commercial land uses) than would otherwise have been possible given underlying land use restrictions.
3. The landowner retains ownership of her land and is free to sell it at a later time, albeit with the newly acquired encumbrance that prevents any future owner from developing the land in whatever manner is described by the restriction.

In this situation, TDR would appear to benefit current landowners who get to "sell their land twice", land developers who are still able to develop, and the surrounding community that enjoys the benefits achieved through conservation of a public amenity.

A farmer, for example, receives the financial benefit from selling development rights, and is (usually) able to benefit from the sale of the land and any remaining economic value in the land at a later time. The developer who purchases the development rights can use them to develop land elsewhere, and all members of the community in which the transaction takes place (including those who will come to live there in future) benefit from the preservation of prime agricultural land and the rural character of their community.

It should be noted that transactions are seldom as simple as that just presented. Different institutions are often involved in transactions and those institutions often function according to very different rules. As suggested in the findings presented below, programs themselves vary widely in their structure and means by which they operate. These factors introduce greater complexity to TDR transactions, which can appear conceptually quite simple.

Mandatory vs. voluntary programs

The voluntary nature of participation in TDR is often praised as one of the aspects TDR that makes it superior to conventional, regulatory techniques. TDR, for example, provides relief in situations where restrictive, open space, cluster development or large lot/agricultural downzoning alone would diminish the development potential and consequent economic value of the affected land. In this case, TDR appears to make an otherwise "mandatory" regulation more "voluntary" by providing an alternative to suffering the economic effects of regulation. But TDR and zoning (restrictive and otherwise) work in concert with one another. They are not two unrelated policies to be compared but rather they are two techniques that together can constitute effective land

use management policy and need to be discussed accordingly. TDR does not salvage equity by easing mandatory regulations that is placed on landowners through zoning. Instead TDR (if it is implemented carefully) enhances mandatory approaches like zoning by making it easier for stakeholders to "do the right thing" and work toward public interests delineated in a community's comprehensive plan and implemented through its zoning, development, and subdivision codes.

TDR programs differ from one another in their degree of "voluntary-ness" or "mandatory-ness." Some programs are more voluntary and others more mandatory. Where a particular programs fall on the continuum depends on how zoning and other mandatory regulations are used in relation to the transfer of rights from land in sending areas and the vesting and use of those rights in receiving areas. Programs do not force landowners to sell development rights, but the development potential of a parcel may be so constrained by regulatory restrictions and natural limitations that a landowner may feel that she has no other choice but to sell the development rights from the land in order to realize some economic return. A sending area may be downzoned from 1 dwelling unit/acre to 1 dwelling/40 acres significantly reducing development potential and economic value. The sentiments of the effected landowner notwithstanding, a TDR program may still be considered "voluntary" when it has not downzoned sending areas in order to strengthen incentives. When development disincentives are imposed or exist in these areas the program becomes "mandatory" although participation in the program is not mandatory per se.

The mandatory/voluntary dichotomy is also derived from the way receiving areas are regulated. If density in receiving areas may only be increased through the use of TDR,

the program can reasonably be described as mandatory. If, on the other hand, developers in receiving areas are able to circumvent the use of TDR by adding density through variances, special land use, rezoning or other administrative procedure, the program cannot be described as mandatory. Of the two, sending areas are more often restrictively regulated as a part of TDR implementation. Whether one or other, or both areas become restrictively regulated does not ensure that the new regulations complement one another. As Pruetz (2003) finds, some communities have difficulty achieving a balance that generates incentives to development in receiving areas using development rights transferred from sending areas.

Looking at three case studies, Machemer and Kaplowitz (2002) observe that "mandatory" programs were more successful than "voluntary" ones. Of the three case study areas, none *promote* their TDR programs as "mandatory" although all of them engaged in some form of downzoning at some point during or prior to implementation of their programs. For Tustian (1983), who was actually the director of planning for Montgomery County, Maryland during the early years of that program, significant development restrictions on rural sending area land were essential for success.

TDR banks

TDR banks, Machemer and Kaplowitz reports, perform a variety of functions including facilitating transactions, acting as a buyer of last resort, and strengthening program credibility with banking institutions (p. 789). The highly successful Montgomery County program used a TDR bank to facilitate transactions, matching potential buyers and sellers. In the New Jersey Pinelands, two TDR banks play very

prominent roles in the administration, marketing, and implementation of the Pinelands TDR program.

McConnell et al. (2006, 2003) find that government participation can be important for successful TDR programs. In Calvert County, Maryland, the county began to act as a conduit for accurate market information. Publicizing prices, transactions details, and TDR availability helped to stabilize TDR prices as buyers and sellers were able to enter the market with greater confidence in the value of their investments (p. 642). The County also began to buy and retire TDRs each year. Its announcement of the prices it will pay for TDRs sends signals that further support market stability.

Discussing the highly successful Montgomery County, Maryland TDR program, both Pizor (1986) and Tustian (1983) emphasize the benefits of the TDR bank in that case. For Tustian, a development rights or credits bank endows a TDR program with institutional credibility: in programs where a bank acts as an intermediary in all development rights transactions, buyers and sellers benefit from consistency. Even in programs where TDR banks may play a more peripheral role, buyers and sellers know that the TDR bank can always act as buyer of last resort.

1.3 Theoretical aspects

Despite criticism that the technique is too complex to be embraced by developers and landowners alike, TDR is conceptually quite simple. It allows communities to shift or transfer development from places where development is less desired by a community to places where development is more desirable (Pruetz 2003; AFT 2001). Like traditional land management techniques such as zoning, and more innovative techniques like cluster development, TDR programs are primarily concerned with locating different land uses in

a desirable spatial arrangement. By incentivizing certain development decisions, TDR facilitates shifts from one type of development or land use to another without completely foregoing an alternative. Although landowners or developers may not be able to realize a particular land use in a particular location, TDR allows these groups to realize development or investment objectives in another location or to recoup equity that would have been lost entirely. Because development carries its own costs, TDR allows landowners to realize some of the potential development value of their land while avoiding or reducing the costs of development (Pruetz 2007).

This contrasts starkly with traditional land use management techniques that use regulations to restrict certain land uses in some locations while allowing those same land uses in others. The difference being, zoning and similar land use controls do not accommodate the alternative (be it an opportunity to develop elsewhere or receive compensation) because they do not allow landowners or developers to transfer the opportunity to develop from one location to another. Transferring development, rather than outright prohibition or restriction, enables larger public interests (often preservation of a community asset or amenity) to be served while protecting the vested rights of a land owner to enjoy private property without undue interference by the state.

Challenges to TDR

Researchers have identified several theoretical flaws that could undermine the operation of transactions. McConnell et al. in a 2003 study of TDR in Calvert County, Maryland address several theoretical concerns. They suggest that two potential problems or economic inefficiencies can arise from this policy: 1) adverse selection can occur when farms, which are not under immanent pressure to convert, are able to participate in

the TDR program thus creating a new cost to preserve agricultural land that would have been "preserved" by market conditions favoring development in other parts of the county; 2) adverse selection can also create additional net development, then, as land that would not have been developed generates new development rights that are used in other locations (p.6).

Thin markets, another theoretical problem affecting the success of TDR programs, arise when markets lack consistent pricing or when buyers or sellers wield monopsony buying power over one another (McConnell et al., 2003). Under these circumstances, transaction costs are artificially raised and "some mutually beneficial trades may not take place" (p. 7). McConnell et al. suggest that TDR banks and direct government intervention may help to correct these conditions by sending stable pricing signals to buyers and sellers and reducing the affect of the *one-time nature* of development decisions.

Aside from theoretical problems with the operation of the system, scholars have identified theoretical problems arising from the effects and outcomes of properly functioning programs. Barrese (1983) assesses TDR for efficiency and equity, finding that when land in sending and receiving areas is restricted, landowners do suffer "wipeouts" (p. 236). Only landowners in sending areas are subsequently compensated through TDR. Reaching Pareto optimality where losses to landowners in sending and receiving areas can be recaptured or "internalized" as net benefits is, according the author, difficult to justify theoretically. Barrese is also skeptical that TDR can distribute benefits of preservation fairly. Landowners in sending areas may face eroding land

values after the imposition of restrictions, and other groups of losers and gainers are not even addressed by TDR—yet their losses and gains are quite (theoretically) real.

Thorsnes and Simons (1999) assert that economists' criticism that TDR fails to efficiently allocate resources has been supported by the performance (or lack thereof) of TDR programs, and they propose a theoretical alternative to "highly administered, zoning-based TDR programs" (p. 257). In this system, development rights are "equitably" distributed across landowners and the market, rather than any regulatory scheme like zoning, is allowed to decide which land will be developed and which land will be preserved. Such an approach is not altogether unlike that used in places like Calvert County where development rights can be used to development the same rural, agricultural lands that generate the development rights in the first place. But even programs like this one function within a regulatory scheme that directs development and preservation albeit to a lesser degree than other programs. No TDR program in the United States operates as a purely "cap-and-trade" system akin to various emissions trading schemes operating in the U.S. and Europe (Walls and McConnell, 2007, p. 22).

The real difference between TDR and MDR from a theoretical perspective is that TDR is highly administered and regulation (zoning) based. The authors quip

> "All that [traditional or conventional TDR programs require] is that the zoning authority gather the information necessary to allocate land across uses efficiently; analyze that information properly; convince elected officials that the analysis is accurate; adopt a zoning map and ordinance; choose, implement, and collect the optimal tax; monitor and enforce the whole system; and alter as necessary with changing conditions. Piece of cake." (Thorsnes and Simon, 1999, p. 260)

In the opinion of these researchers, the aforementioned elements when taken together add cost to transactions and make allocation less efficient and less equitable. For smaller

units of government and communities which may lack the resources to adequately perform these tasks, the consequences are especially acute. TDR could be, theoretically speaking, too cumbersome to effectively and justly administer. But given the distributional benefits of development rights markets, the researchers conclude that "it is likely that some form of MDR program is necessary for effective open-space preservation" (p. 266). Whatever exact form the MDR program takes, it would have to require little administration and avoid the use of zoning except as an instrument to correct market failures.

Other institutions exert significant influence upon the operation of TDR programs and resulting performance. The exigencies imposed by local real estate markets and other economic conditions are important factors affecting program function and performance. Barrows and Prengruber (1975) suggest that market demand characteristics significantly influence program success because market strength largely determines the incentive for landowners to participate in development rights markets. While markets will often change, TDR programs might not, and the ensuing chasm between emerging market conditions and existing program policies and objectives may undermine the future effectiveness of the program. Local market conditions determine whether or not development rights act as an incentive for landowners to participate in market-based land preservation (Walls and McConnell, 2007).

1.4 Conclusion

One of the foremost experts on TDR in the United States, Rick Pruetz, reported in 2007 that altogether 181 TDR programs in 33 states have protected more than 300,000 acres of open space, and agricultural and environmentally sensitive lands (p. 3). Walls

and McConnell (2007) estimate that 140 programs operate in the U.S. and that some have protected up to 49,000 acres (p. 8). According to the American Farmland Trust (2001) the number of programs has grown substantially through 1980s and 1990s as many local governments began formalizing the practice in ordinances. The same report mentions that the growing number of programs was not related to significant gains in farmland preservation—a conundrum central to the work presented by this author. Walls and McConnell (2004) contend that TDRs "have met with only limited success [...] only a handful have had active markets with numerous trades of development rights each year and a significant amount of preserved acreage" (p. 13).

Described by some as "creative, innovative, and even experimental" (Pruetz, 2007), many questions concerning the operation and overall effectiveness of TDR as a land use (and economic development) tool remain open to investigation and critique. Exactly how many TDR programs are in fact functional is unknown (and one of the questions examined in the research presented herein). For despite its growing use among communities for various purposes, McConnell et al. (2006) contend that

> Whatever the stated goals, in practice, few TDR programs have been successful in meeting those goals. In fact, many programs are 'on the books' but remain inactive, i.e. few development rights have been transferred. (p. 632)

While 181 TDR programs may exist in some sense as laws or regulations that have been formally adopted by legislative and administrative entities, this number does not mean that more communities are successfully meeting their land use (and economic development) goals through TDR.

Despite its shortcomings—both theoretical and empirical—more than a few communities have managed to implement TDR programs that have enabled them to

protect vital resources and public amenities while accommodating and even supporting growth—urban, economic, and otherwise. Perhaps the most successful programs have accomplished this by recognizing that these goals need not conflict, but can provide conditions necessary for functioning TDR markets (Machemer and Kaplowitz, 2002; Pruetz 2003). Whatever the case, further investigation is required to determine what factors contribute to success and when success has in fact been achieved.

2 Measuring success

This chapter departs from the historical, conceptual, and theoretical aspects of the first chapter as it provides a comprehensive discussion of current empirical research concerning TDR and related practices including purchase of development rights and other growth management techniques and strategies. Common themes and areas of inquiry addressed by past research are identified and discussed, and connections are made between research into TDR and similar land use programs.

Having surveyed this body of knowledge, the author recommends a direction for additional research. Specifically, this chapter probes the shortcomings and limits of previous research in order to derive research objectives that frame the remainder of this study. These objectives address the limitations of previous methodologies, most notably case studies and other approaches that have proscribed research to the examination of a limited number of renowned programs.

Research objectives also address areas of inquiry that have not been explored in a systematic and comprehensive manner by previous investigations of TDR programs. These areas of inquiry can be roughly delineated in two groups: success factors and success indicators. It is the aim of this chapter to bring some of these to the foreground.

2.1 Evaluating growth management

TDR, at least in most of its iterations, attempts to guide or manage the development of urban and rural areas and is one of many techniques falling under the umbrella of growth management policy. Indeed, most analyses of TDR have sought to place it among other growth management techniques (particularly land preservation techniques), often emphasizing the desirability of programs that use multiple techniques including

TDR in complementary and mutually supportive relationships (McConnell et al. 2007, 2003; Brabec and Smith, 2002; Brody et al. 2006). A brief survey of research devoted to the evaluation of growth management and land preservation techniques should, therefore, provide some context for the examination of TDR.

From a policy standpoint, understanding the effects of growth management policies as implemented under conditions imposed by real communities and real landscapes would seem to be an important priority for researchers. While such research could prove valuable for practitioners who administer growth management programs, relatively little effort has been devoted to devising empirical measures of program outcomes. Reflecting on existing growth management research, many authors have called attention to the paucity of empirical study into growth management program outcomes (Bengston et al., 2003; Daniels and Lapping, 2005; Wassmer, 2006). Daniels and Lapping (2005) survey land preservation and smart growth research, looking for existing connections between these two planning practices and recommending ways that smart growth might benefit from greater integration of land preservation strategies into comprehensive approaches for combating urban sprawl and directing development toward beneficial ends. The researchers discuss studies of a variety of land preservation techniques including TDR. They find that land preservation research has been largely disconnected from growth management research noting that "planners have been slow to recognize the power of land preservation as a planning tool, and planning academics have generally avoided the topic" (p. 325). Because of this, there is a need for studies that investigate the ways land preservation programs affect growth management.

Some research has, nevertheless, attempted to explore growth management program outcomes and the connection between growth management and land preservation. Examining what he describes as "two of the most blunt land-use planning instruments contained in the Smart Growth toolkit", Wassmer (2006) conducts multivariate regression to measure the effects of statewide growth management and urban containment policies on the land area of 452 U.S. Census Bureau defined urban areas (UA's) in the United States. His regression model includes factors that, according to previous research, account for the growth of urban areas into surrounding rural communities—urban decentralization. Factors taken into account include functions for "natural evolution", "flight from blight", "fiscalization of land use", "regional variation", and growth management programs. Growth management programs are defined by several program features and placed into categories: strong and weak containment programs that either restrict or accommodate growth; programs in states with statewide growth management that require vertically, horizontally, and/or internally integrated urban containment. Controlling for factors like "flight from blight" and "natural evolution", Wassmer observes that local programs in states where vertically and horizontally integrated growth management is required achieve substantial, statistically significant reductions in square miles of their urban area (p. 54).

Wassmer also finds that time can affect the performance of urban containment programs. For states like Florida which require vertically, horizontally, and internally consistent growth management, a "10-percent increase in the number of years on the plan is expected to reduce the [size of a UA] by 0.4 percent [...] from what they would have been without the state-imposed growth management regime" (p. 56). Wassmer continues

to state that for the "typical U.S. UA in year 2000, every 10-percent increase in the years [a restrictive form of local urban containment] is present is expected to decrease the urban area's size by -0.12 percent" (p. 56).

Other researchers have employed different methods for measuring the performance of growth management techniques. Conway and Lathrop (2005) address whether or not the ever increasing number of growth management schemes implemented throughout the United States actually achieve their purported "ecological" objectives. Echoing the observations above, these researchers contend that although theoretical modeling (primarily economic models) has been able to identify conditions conducive to the successful *implementation* of growth management policies, such accounts have not empirically assessed actual outcomes of those policies. Rather than use hedonic pricing or regression, Conway and Lathrop employ a spatial constraints model to project the potential effectiveness of four growth management techniques (downzoning, cluster development, wetlands/water buffers, and open space protection) in two study areas. The modeled outcomes of alternative development scenarios are then compared using four metrics to capture the impacts of development on ecosystems in the study areas. Metrics are percent of total area preserved, number of patches, mean patch size, and perimeter-area ratio (p. 284). The researchers conclude that this approach successfully identifies land uses most likely to undergo urban conversion as well as the location of those parcels. Based on their findings, Conway and Lathrop are able to determine which of the four conservation strategies would best avoid landscape fragmentation, preserve pristine natural lands, enhance water quality, and preserve open space (Conway and Lathrop, 2005, pp. 287 – 289).

Using a case study, a common research methodology in land preservation literature, Daniels (1999) examines farmland preservation programs in Lancaster County, Pennsylvania and briefly explores the possibility of implementing similar programs in other states. He delineates 5 measures of success: 1) protection of a critical mass of agricultural land, 2) maintenance of affordable land prices, 3) long-term reliability, 4) cost-effectiveness, and 5) sustained social and political capital (p. 263). Affordable land prices, for example, contribute to the success of preservation programs by enabling farmers to acquire additional land thereby improving profitability and long-term commitments to use the land for agricultural purposes. Sustained social and political capital, or public support and political leadership, could be construed as success factors as well. Only the first measure, critical mass, gets at an objective measure of program performance that is a terminal objective—it is one of the final goals of agricultural preservation. Here Daniels observes that

> "Lancaster County has made good progress toward the protection of a critical mass of farmland [...] As of 1997, 320,000 acres of farmland were zoned for agricultural use [...] From 1983 through 1998, nearly 30,000 acres of farmland were preserved for farming" (p. pp. 265-266).

On its face, 30,000 acres would appear to be a significant amount of preservation. But, as Daniels notes, this represents only 7 percent of farmland in Lancaster County (p. 268). Unfortunately, Daniels does not attempt to explain why 7 percent is sufficient. He does not justify a threshold beyond which performance (in this case the number of acres protected) can be deemed "successful."

As mentioned before, many analyses of growth management have explored the mechanisms and circumstances surrounding or contributing to the successful

implementation of growth management policy. In the course of studying the effects of state mandated growth management policy on local planning for natural hazard mitigation, Burby and May (1997) evaluated comprehensive plans of eighty eight communities in California, Florida, and North Carolina. Their intent is to test the proposition that state mandates promulgate more, higher quality local comprehensive plans than are found in states without mandates. Similarly, Brody et al. analyze "factors contributing to the adoption of local sprawl-reduction policies" implemented by local governments in Florida (p.297). These studies have certainly contributed valuable information to the investigation of growth management policy, particularly its institutional facets, but often avoid discussion of the outcomes of the policies that are implemented. Paraphrasing a 2002 study published by Hollis and Fulton, research and evaluation of growth management techniques "[tend] to focus on describing instruments and programs rather than evaluating their impacts" (Bengston et al., 2003, p. 280).

The reasons for this are varied. They include "lack of knowledge of the counterfactual," and the lag between implementation of growth management techniques and expected outcomes (Bengston et al., 2003, p. 280). The former can and has been addressed through econometric (Beaton, 1991) and other methods including spatial constraints modeling (Conway and Lathrop, 2005). Whatever the reason, Bengston et al. exhort that "there is a need for careful *ex post* evaluation of the effectiveness and impacts of growth management efforts" (p. 280, italics in original). Post hoc evaluation is not without its problems, and is by no means a definitive measure of program success and failure. Nevertheless, the call for more empirical study of growth management programs seems to be reasonable given the prominence of the growth management in planning

practice and the lack of understanding surrounding the measurement of outcomes. Given the attention currently paid to TDR as a growth management strategy, developing an empirical account of program outcomes and success factors is of great interest.

2.2 Evaluating TDR

Although TDR is but one of many growth management strategies, its unique features and currency set it apart and complicate attempts to evaluate its outcomes. Perhaps because TDR has been used to balance and protect the competing economic and other interests, expectations of its capacity to create win-win outcomes have been unreasonably inflated. After a 1997 conference devoted to the practice, Robert Lane, director of the Regional Design Program at the Regional Plan Association, reported that

> It became clear during the conference that the perceived success or failure of TDR programs was colored by excessive expectations. The notion that a TDR program would, by itself, protect open space, preserve activities such as farming, help create appealing village centers, and do all of this simply by offering a mechanism for moving development around is simply not realistic. (p. 2)

Apart from being unrealistic, such expectations obscure the fact that TDR is not a panacea for land use conflicts but rather one means of incentivizing certain land use decisions that support the public interest and distributing the cost of those decisions across a wider geographic area and across a wider portion of a community (and perhaps even over a longer period of time).

Within the context of hyperbole and misunderstanding there is a need for broad, empirical study of the factors that lead TDR programs toward success or failure, and metrics by which program success might be judged. Machemer et al. (in press) note that "previous published literature is unclear on how widely TDR programs have been

embraced or adopted by communities. Nor has the literature empirically evaluated TDR program implementation or success" (p. 2).

While research has tended to examine theoretical issues related to land economics and issues of equity surrounding TDR (Beaton 1991; Barrows and Prenguber, 1975; Barrese, 1983; Thorsnes and Simons 1999), other studies have investigated empirical program outcomes. Brabec and Smith (2002) compared the effects of "three dominant" land preservation tools on farmland fragmentation in three communities in the United States. Much like the research of Conway and Lathrop (2005), effectiveness was measured by the number of acres preserved, average parcel size protected, contiguity of protected lands, and level of post-protection agricultural activity. The researchers were able to observe that TDR and PDR programs protected farmland more effectively in terms of acres preserved (p. 262). This held true for other indicators like parcel size and contiguity as well.

Studies like these are very helpful as they examine or model the real world impacts of TDR (often alongside other land conservation techniques). Such research raises important issues and can help to frame questions for further investigation. Case studies that examine individual programs or compare several at a time add even greater depth to this discussion.

Case studies

As is true for much of the literature that examines other growth management and land preservation techniques, much of what has been learned about the empirical performance of TDR programs comes from qualitative approaches—especially case study. Perhaps the most well-known study of TDR is that presented in Rick Pruetz's *Beyond Takings*

and Givings (2003). In addition to discussions of theoretical issues related to TDR, Pruetz provides briefs case studies of 142 TDR programs. Each profile examines any number of issues and does so in great detail. But programs are not compared against one another using a single standard or set of standards. This is true for much of the academic research devoted to TDR.

In an early case study of two TDR programs, Pizor (1986) identifies 7 success factors including receiving areas "well sited for immediate development", comprehensive and mandatory development restrictions, TDR banks, and neutral parties to facilitate transactions between buyers and sellers and provide unbiased, accurate transaction information (p. 210). In concluding his discussion of TDR in Montgomery County and the New Jersey Pinelands, Pizor comments that the performance of those two programs demonstrates "that such programs are capable of preserving large areas of open space with a minim of public expenditure" (p. 209).

McConnell et al. (2003) assess several indicators of program success for TDR in Calvert County, Maryland, including 1) the number of acres preserved, 2) the location of properties preserved, 3) prices over time, 4) short-run changes in quantities of TDRs sold, 5) and thinness of markets and transactions costs (p. 17). They report that the Calvert County program appears to be achieving its goal of preserving agricultural land located in its most restrictively zoned areas with 79 percent of all land entering APD status and 73 percent of permanently preserved land located inside "Farm Community" and "Resource Preservation Districts" (p. 20). The researchers do not attempt to predict the likelihood that the program will achieve its long term goal to preserve 40,000 acres of agricultural land by 2020.

Against this backdrop of measured outcomes, McConnell (2003) assess the effectiveness of program components. Data show that the cumulative number of acres in the protected agricultural area has continued to grow faster than the cumulative number of permanently preserved acres suggesting that some landowners are confident in upward price movements—thanks in part perhaps to price stabilizing interventions by Calvert County. Such calculations on the part of current landowners would seem to be supported by market trends that began in the early 1990s and accelerated in 1999 after substantial downzoning took place. Since 1993, the researchers document approximately 51 TDR transactions a year. Aside from initiatives taken by the County to create conditions that are optimal for TDR success, McConnell et al. also note that market conditions enable the program to be successful: there is enough demand for higher (slightly higher) density to encourage developers to purchase TDRs and enough economic benefit in agriculture to encourage continued farming (p. 27).

But the researchers leave a lot of questions unanswered. As mentioned just above, they imply that market forces and government policy in Calvert County have somehow achieved economically optimality. The authors, however, do not supply readers with any objective criteria by which the effectiveness of program outcomes might be judged, nor do they describe a model—economic, statistical, or otherwise—that might scientifically justify this conclusion and enable extrapolation of results from Calvert County to other communities. Assuming local real estate market conditions, single zone sending and receiving areas, a TDR bank, etc. have made TDR successful in Calvert County, can that knowledge be applied to other cases? Are these success factors at all universal, or strictly parochial?

Standardizing TDR program features and establishing a standard for the evaluation of program performance begins to address the challenges posed by these unanswered questions. With this in mind, Machemer and Kaplowitz (2002) examine three short case studies. The first case study area is Mannheim Township, Pennsylvania. This community has long considered its agricultural land to be very valuable, as expressed by its 1987 comprehensive plan. The second case study is Montgomery County, Maryland. Montgomery County, too, has long recognized the value of preserving agricultural land and has worked toward that end through many policy actions throughout its storied history of land preservation. The last case study area is the New Jersey Pinelands, which has had a TDR program since implementation of the Pinelands Comprehensive Management Plan in 1980. These three case studies are analyzed through the prism of 13 program elements that the authors suggest are common features.[1]

Machemer and Kaplowitz assess the three case study programs against several measures of success including the *number of development rights transactions* and the *number of acres preserved* for each program (p. 780). Montgomery County's TDR program is considered successful; Pinelands and Mannheim register as moderately or less successful because they fail to meet the same set of criteria. But as the authors themselves are well aware, the question of ascertaining a single, quantitative indicator of program success is left open to further investigation. And 3 cases are insufficient to establish the statistical characteristics of an entire population of TDR programs.

One of the cases selected by Machemer and Kaplowitz happens to be one that is widely regarded as one, if not the, most successful TDR program—ever. It can reasonably be argued that the literature devoted to the Montgomery County, Maryland

[1] Aspects of some of these same variables are discussed below in "Chapter 3: Methodolgy"

program alone constitutes a substantial percentage of the scholarly TDR research. Tustian (1983) writes a detailed case history of a nascent Montgomery County, Maryland program. The account follows the program from its earliest implementation as a "TDR trial balloon [...] in the form of a staff draft master plan for a local area in the wedges around a satellite village called Olney" to a fully realized, highly successful county-wide program (p. 68). Tustian delineates program components, explaining the functions of each and reasons why certain components were included in the program. A TDR bank, for example, was proposed to bolster public confidence in the program and the institutional viability of a private development rights market (p. 68). In addition, Tustian describes program successes of the first five years of operation including more than 400 DRs sold and 2,000 acres preserved, reduced development costs in receiving areas, reduced costs of agricultural land to be used for farming, and reduced costs for public acquisition of land to preserve as open space (p. 64).

Alongside Montgomery County, Walls and McConnell (2007) provide case studies of 9 other TDR programs in Maryland, Florida, California, Washington, and New Jersey. The study describes programmatic goals, design, and performance. The researchers argue that program success/failure should not be determined comparatively. In others words, success and failure are relative for Walls and McConnell—relative to the stated goals of each program. Discussions of program design and performance are, therefore, confined to each program and little attempt is made establish statistical characteristics of all 10 programs. Nevertheless, Walls and McConnell do make several general observations about TDR based on their experiences with these 10 programs. Among them, the problem of adding density to receiving areas is one of the most pressing. Many

programs are unable to add density in receiving areas due to public opposition and underlying real estate market dynamics that simply do not favor the densities envisioned within a receiving area (124). Aside from this challenge, programs may also create barriers to program usage by adding procedures that create uncertainty for developers or conversely by enabling developers to circumvent TDR by adding density through other procedures and programs.

As is the case with growth management research (Brody et al., 2006; Burby and May, 1997), empirical research into TDR programs has focused more on program features and mechanisms than program outcomes. While many case studies have primarily concerned themselves with program features, some research strives to examine both program features and outcomes of multiple programs. Recent research by Machemer et al. takes the evaluation of program features beyond individual cases and toward an examination of TDR as a widespread practice with features that are common to a number of programs. They comment that "While there are several well-known TDR programs, there is no central repository of information on TDR programs" (in press, p. 9). Nor have there been attempts to create a broadly applicable rubric for classifying program components before adding them to a "central repository." Accordingly, the researchers develop an "evaluative framework" in order to systematically identify components of multiple programs. They hypothesize that "programmatic characteristics and elements of TDR programmes [can] be identified, that TDR programmes characteristics could be used to structure a TDR programme evaluative framework and [...] that a TDR evaluative framework would be useful for measuring the relative success of individual TDR programmes" (p. 776). Fourteen programs are analyzed in order to derive the list of

programmatic characteristics and elements, while three case studies (mentioned above) were isolated to test the appropriateness and utility of the framework for evaluating TDR at regional, county, and local levels. The authors find that "the evaluative framework and the comparative analysis of the three TDR programmes illustrate the usefulness of a TDR evaluative framework" (p. 791).

Common program elements or components can be identified and analyzed in a systematic manner potentially opening TDR to more comprehensive study. Their most recent research that builds on this finding and the foundation provided by the evaluative framework. Machemer et al. (in press) apply the evaluative framework to 52 operating TDR programs looking for evidence of relationships between program outcomes and contributing factors. The investigators advance 7 hypotheses:

1) TDR programs in communities with PDR programs are more successful
2) TDR programs that use development rights banks are more successful
3) TDR programs in states with legislation that enables TDR are more successful
4) "It matters" how many parties or interest groups initiate TDR programs
5) "It matters" how many goals guide the creation of a TDR program
6) Demand for housing stock is important for success
7) Conducting studies of local conditions "matters" for TDR success

Data collected were based on the opinions of individuals administering TDR programs in communities throughout the United States. Of the 7 seven hypotheses, Machemer et al. (in press) find several statistically significant relationships between success factors and indicators of success. Among them, TDR programs were more successful in

communities with PDR; the presence of TDR banks was associated with successful programs; state enabling legislation was not found to be significantly associated with program success; the number of stakeholder groups responsible for initiating TDR was related to success; the number of programmatic goals was not related to success; successful programs were more statistically more likely to have conducted studies prior to implementation.

While the findings correspond to those of many case studies, the indicator of success that is used in this study makes the application of findings somewhat problematic. For one, the metric used to qualify a program as successful is based solely on respondent opinion. Elsewhere in the study, Machemer et al. suggest using acres preserved and number of transfers as indicators of success but avoid using either in this study for several reasons. Acres preserved, they argue, is not an appropriate measure for programs due to the difference in program types: urban programs might not typically operate to preserve land in the way programs might in rural areas where the preservation of agricultural land is the primary or only program goal. They also note that because different programs use rights in different ways, the number of rights transferred may mean very different things from one program to another (p. 14). In a program that has allocated only 1 development per 40 acre parcel, transferring 1 right preserves 1 acre of land versus a program that allocates 1 right per 5 acres of land where such a transfer of 1 right preserves 5 acres. This is an oversimplification, but even such a simple formulation demonstrates just how difficult it could be to use "number of rights transferred" as a measure of program success. The problem with using "rights transferred" and "acres

preserved" is that neither has been standardized in such a way as to make them a universally applicable measure of program success.

Avoiding both of these metrics for the reasons just mentioned, Kaplowitz and Machemer (in press) instead choose "respondent opinion of program success" as the sole success indicator because "virtually every respondent answered the survey question about how their program was working" (p. 14). Nearly 40% of respondents reported that their programs were successful. Exactly what is meant by "success" is not discussed further or defined in the paper opening this measure to some question. Without such a discussion, one is left to wonder how the opinions of program administrators could provide a reliable, and valid indication of program success or failure. This is of particular concern in the context of what has already been discussed above: success and failure of TDR programs seems to rise and fall with perceptions of its potential to address conflicts arising from land use decisions. For example, if a program administrator believes that TDR is not meeting expectations that were based on overly optimistic estimations of its capabilities, she may be inclined to discredit modest program gains made by program that is actually performing. Likewise, if a program administrator is initially skeptical of the merits of TDR, she may be impressed by and overestimate the value of modest gains made by an underperforming program. Finally, if an administrator was involved in the design of the program and had foreknowledge of concepts like those being developed by the research presented here, the presence or absence of institutional features that she may believe are associated with success may skew the self assessment. Whatever the case may be, more study of the relationship between administrator perception of program success and other objective indicators needs to be pursued.

Despite the shortcomings of their research, Machemer et al. (in press) move research into TDR forward quite substantially. Before, research had not established a set of programmatic components to be investigated, nor had it analyzed the characteristics of such a large sample of programs. The sample, moreover, included a range of programs in geographic and programmatic terms. This is, perhaps, the first study to have collected data from programs operating in strictly urban contexts. Geographically speaking, this study includes programs from across the United States. Both of these innovations contribute much to a body of knowledge that had largely restricted itself to the investigation of TDR that preserves agricultural land in rural communities at the urban fringe in a handful of different states.

2.3 Conclusion

Relatively few comprehensive, empirical investigations of growth management and TDR have been conducted. Of the empirical research that has been performed, much of it has tended to examine program components but not program performance. Case study approaches, which have dominated the research, have allowed investigators to identify some relationships between the characteristics of program components and programmatic outcomes. Perhaps due to the pervasive belief that "every program is different," measures of programmatic success/failure have not been developed across multiple cases. This limits the validity of generalizations drawn from existing empirical research. For the most part, current empirical research has had much to say about individual programs and very small samples of individual programs, and little to say about the performance and viability of TDR in a broader sense.

Theoretical analysis of TDR (presented in Chapter 1) is primarily concerned with the broader implications of the technique. Several of those accounts (Barrese, 1983; Thorsnes and Simons, 1999; Barrows and Prenguber, 1975) question the potential efficacy of TDR to address its stated goals while protecting the equity concerns of various stakeholders. These same analyses also scrutinize the ability of TDR to create markets that efficiently allocate land and resources. Thorsnes and Simons capture the position of much of the theoretical and economic analyses of TDR saying "Not surprisingly, the economists who have studied conventional zoning-based TDR programs find little to applaud" (p. 257). Case studies can address theoretical concerns (Wall and McConnell), but only in that instance.

With 140 to 181 programs operating throughout the United States, and more communities considering implementation of the TDR every year, there is a need for comprehensive and systematic analysis of core TDR program factors and measures of success. Among factors these factors, several of particular interest emerge from the literature: mandatory versus voluntary programs; programs with TDR banks; public involvement in implementing TDR; programmatic goals of TDR programs. Without such analysis, lessons learned in one community are of questionable value for others. This is not to diminish the contribution of case study research: those studies have revealed much about operation and performance of TDR in specific instances. But case studies do not consider whether or not comparisons can be made between TDR programs in the first place, and nor do they attempt to develop the objective grounds upon which comparisons and valid inference might be based.

3 Methods

3.1 Research overview

In the gaps between existing empirical investigation and theoretical treatments of TDR many questions concerning the function and performance of TDR programs remain unanswered. Existing empirical research has mostly involved case studies of a limited number of TDR programs and has not attempted to collect data from a large number of programs and analyze programmatic performance on a broad scale.

Case studies and other empirical research have contributed significantly to the understanding of the operation and performance of individual programs but questions about the relationship between program characteristics and outcomes over a larger sample of TDR programs remain unanswered. As such, the relationships between program characteristics (success factors) and program performance (indicators of success) can only be implied but not scientifically inferred beyond individual cases. A consensus seems to have emerged around the well studied successes of TDR in places like Calvert and Montgomery County, Maryland or the New Jersey Pinelands. But this consensus cannot replace an understanding of TDR that is based on a systematic comparison of characteristics and outcomes from a larger number of programs representing different types of communities. While scholarship lauds programs in Montgomery County, Maryland it has had little to say about the implications of those successes for programs in other communities.

Because so few attempts have been made to study TDR in such a manner, research is needed to identify methods capable of achieving comprehensive, objective assessment of the state of the art. The prevalence of various program components and related conditions (e.g. the existence of TDR banks, the age of programs, number of goals, etc.)

needs to be established as does their effect on the performance of TDR programs. While previous research has described the program characteristics of a limited number of programs in great depth, it has not explored success factors and indicators of success across a large number of programs. The statistical characteristics of the 181 TDR programs that may be operating have not been established. Whether or not 181 TDR programs are working actively to preserve agricultural and environmentally sensitive land and protect historically significant sites, remains open to investigation.

One of the objectives of the research presented here is to establish some definition of program success—albeit a provisional one that will require more testing before it can be broadly applied. In order to establish any provisional criteria, however, the characteristics of a large sample of programs need to be analyzed. Only after identifying the characteristics of distributions of possible indicators of success, can success factors be tested for associations with those indicators.

This study attempts to compile data from a large number of programs, many of them operating at and within different units and levels of government; with different purposes; and within vastly different geographic, ecological, and socioeconomic contexts. By including as many programs as possible, it is hoped that a set of program features (discussed below) will emerge that contribute to or may even predict successful outcomes for TDR programs more generally.

Therefore, the author has collected data from through a nationwide survey of TDR programs and presents a quantitative analysis of that data. In subsequent sections, the author will

1. Present descriptive statistics for success factors and indicators

2. Suggest a metric for assessing program success
3. Identify program features or success factors that are statistically related to program success as described in the following hypotheses:
    a. The level of the unit of government administering a TDR program influences program performance
    b. So-called "mandatory" TDR programs are more successful than voluntary programs
    c. The geographic extent or size of a community/political jurisdiction does not influence program performance
    d. TDR programs that operate in the presence of a purchase of development rights program are more likely to be successful than those that do not
    e. TDR programs that use TDR banks are more likely to be successful than those that do not
    f. TDR programs with higher numbers of program initiators are more likely to be successful than those with fewer program initiators
    g. TDR programs with more programmatic goals are more likely to be successful than those with fewer objectives
    h. Programs that have been operating longer are more likely to be successful than those that have been operate for shorter periods of time.

3.2 Survey Instrument

Interviews of planning practitioners have been used to collect data from TDR programs in previous studies. Interviews form the core of qualitative, case study research that predominates the recent academic study of TDR, land preservation, and growth management. But earlier in its history, study of TDR did not include the observations of program administrators and program participants. Writing in 1986, Pizor comments that "no study exists in which those who actually have participated in the buying, selling, and brokering of TDRs have been consulted" (p. 203). To address this gap, Pizor interviewed 84 planners, developers, real estate professionals, bankers, attorneys, and landowners involved in the administration and execution of Montgomery County, Maryland and New Jersey Pinelands TDR programs. Pizor used both oral and written (mail-in surveys) to interview these "key informants."

The survey developed for research presented here is based on a survey of key informants conducted by Machemer and Kaplowitz in 2002. In that case the survey was a self-administered, mail survey consisting of open and closed-ended questions. A multiple-method approach was used to design and pretest the survey. Initial review of literature, interviews with planning practitioners and scholars identified "key gaps in knowledge" concerning the operation of TDR programs. The survey divided 56 questions into six sections including 1) program orientation, 2) sending and 3) receiving areas, 4) market history, 5) program components, and 6) identification of TDR programs (p. 10). A maximum of 5 attempts were allowed for each respondent.

Data presented in this study was elicited from planners or government officials administering and operating transferable development rights programs in communities

throughout the United States based on a list of programs created by Pruetz in 1997, and amended in 1998 by Machemer. An initial list of 142 programs was narrowed to 109 based. Three (3) new programs were discovered through interviews, and added to the list giving a total of 112 programs. Again, no more than 5 attempts were made to contact respondents. Telephone and email inquiries were made to 1) identify the individual or individuals most capable of answering the survey questions. In some cases this proved difficult because some programs had been inactive for so long that respondents were completely unfamiliar with the TDR programs operating under their authority.

The survey (see Appendix) was altered over the course of the data collection period in order to improve its performance. It was, initially, too long and failed to elicit responses to questions concerning quantitative program outcomes. Interviewees were, in many cases, unable to accurately recall detailed information. Email follow-ups were often used in these cases to capture key information that a respondent was simply unable to remember during an oral interview. Survey questions were not altered significantly during this process. The questions were grouped according to themes identified by areas of inquiry.

Interviews were conducted by telephone, email, and emailed survey. Almost all of the telephone surveys were recorded, but at this time have not been transcribed. Interviews lasted anywhere from several minutes in the case of programs with little or no activity to well over an hour. Interviewees voluntarily provided additional or supplemental information consisting of planning documents and records, and third party documents including reports prepared by consultants and external agencies. Survey responses, including information from these other sources, were then entered into a

database. Responses were recoded to facilitate quantitative analysis. The recoding process was iterative.

3.3 Statistical Analysis

Statistical analysis and further data manipulation were performed using SPSS®. In order to create a more consistent dataset capable of generating valid results, non-urban programs and urban programs were investigated separately. Due to limitations of this paper, findings for the 6 "urban only" programs are not presented here.

Statistical tests were chosen based on the characteristics of data gathered through the survey and other sources. For this study, distributions for variables *acres preserved*, *percentage of sending area preserved* (PSAP), and *percentage of total land preserved* (PTLP) are all non-normal (see Chapter 4: Findings). Nonparametric tests are appropriate for non-normal distributions. Mann-Whitney U test allows for comparisons of 2 samples of ratio data grouped by dichotomous values from a binomial variable. Values from each sample are ranked, rankings are compared, the results of those comparisons summed, and means calculated for the sums. The test then calculates the probability for that each sample is drawn from the same distribution. The test calculates significance levels for one and two-tailed tests and is therefore suited to hypothesis testing of binomial/continuous and binomial/ordinal variables where the direction of relationships is posited. Where two continuous variables were analyze, bivariate correlation was performed to test association, direction, and strength of any linear potential linear relationship.

4 Findings

In this chapter, the author presents results from a nationwide survey of TDR programs. Descriptive statistics and statistical tests applied to indicators of success and success factors are presented.

4.1 Response rate

American Association for Public Opinion Research (AAPOR) minimum response rate (RR1) was calculated by dividing the number of completed interviews/survey by the total number of potential respondents. Potential respondents include all complete and incomplete interviews and surveys, refusal/non-responsive contacts, and unknown ineligible cases. RR1 for the survey instrument used in this study was 59.14 percent. (see Table 1).

Table 1: Minimum Response Rate

	#
Interviews/survey attempted	70
Cases of unknown eligibility	16
Refusal/non contact	20
Known ineligible cases	13
Potential respondents	93
Completed Interviews/surveys	55
RR1	59.14%

4.2 Indicators of success

Number of transfers and transactions

The *number of transfers* and *transactions* can often be found throughout TDR research as an indicator of program performance. TDR programs responding to this survey used a variety of methods for documenting the number of development rights transferred, and data was not recorded using a consistent unit of measurement. Programs

reported as few as 0 rights transferred and as many as 1,554 **documented** rights transferred.

Programs seemed more likely to consistently document the number of transactions that have occurred. Although the average number of transactions was 24.80, the median indicates that 50 percent of the 35 programs reporting this information have had fewer than 3 transactions. Twenty (20) percent of all the programs reported 0 transactions. The distribution of *number of transactions* was very dispersed ranging from 0 to 280.

Assets preserved

Another indicator of program performance is the extent of preservation. This is usually measured in square feet in the case of urban TDR programs, or in acres for programs where tracts of land are preserved. For the majority of TDR programs which are primarily concerned with preservation of land and other spatially defined amenities like historic buildings, this indicator is often used to document program performance.

Research presented here reveals several interesting aspects regarding this metric. First, acres preserved as reported by 36 programs[2] exhibits a highly dispersed distribution ranging from 0 to 100,000 acres. Even with the high outlier case removed (100,000 acres preserved in King County, Washington), the histogram in Figure 2 depicts a highly dispersed, positively skewed distribution. The data cannot be described by a normal distribution, especially with the preponderance of "0" data. Aside from the statistical challenges that this poses for statistical analysis, the shape of the distribution also says a lot about TDR program outcomes: the distribution is very skewed because (as was true for the number of transactions) many programs have not preserved **any** land whatsoever.

[2] To achieve greater consistency across data, only TDR programs that function primarily to preserve tracts of land were considered here. Programs that operate within the boundaries of more heavily urbanized areas to preserve historic buildings or direct economic redevelopment are not included.

In fact nearly one fifth of the 36 programs that reported the number of acres preserved indicated that their programs had not managed to preserve any land. This means that within the lowest quartile, only one program preserved one acre—all others results in the lowest quartile were 0. The total number of acres preserved by programs falling below the median of 231 acres was 584.59. On the other hand, programs in the top quartile have preserved 143,000 acres—the top 25 percent of programs preserved 99.6 percent of total acres preserved by TDR programs considered in this study.

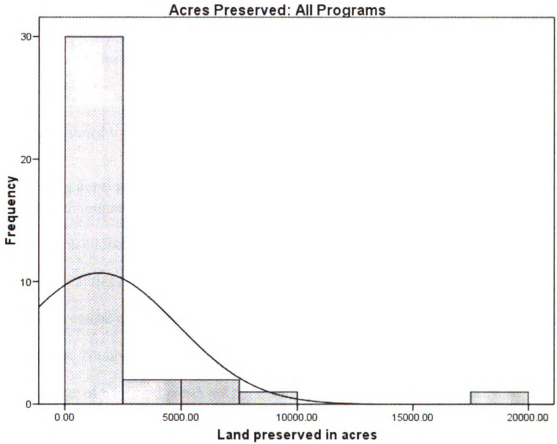

Figure 1: Histogram showing distribution of acres preserved by TDR for all local and county programs, excluding outlier that has preserved 100,000 acres—more than 5 times that of the next highest case.

Differences between local and county administration

As addressed in greater detail below, there is a statistically significant difference between the samples of acres preserved when grouped by level of government administration. Locally administered and county administered programs have preserved statistically different amounts land. Given this difference between these two groups, characteristics of each are presented.

Each class contains 18 cases. The mean number of acres preserved by county programs was nearly 10 times that of local programs (2738 versus 222 acres). Median values for these two distributions were dispersed even further apart than the mean values: the median value for counties was approximately 30 times that of local governments (651 versus 20 acres). Local TDR programs have preserved a total of 4003.37 acres, while TDR administered by counties has preserved 149,276.39 acres.

Normalizing acres preserved

Even with programs divided into two categories, differences between individual cases persist. As mentioned before, not all localities or counties are the same size, and individual localities and counties may have very different goals for preservation. Preservation can be represented in a way that accounts for land mass differences between communities. Numbers of acres preserved counts can be normalized by calculating it as the percentage of total land preserved per total land area for a given community or political jurisdiction. Acres preserved could similarly be calculated as the percentage of total acres preserved divided per total sending area acreage. Alternatively, values for total land area could be introduced into a statistical model as a covariant. If a significant relationship were found to exist between total land area and the response variable, total land preserved, the influence of total land area could be controlled.

Normalized by sending area

Percentages of sending area preserved (PSAP) for the 22 cases reporting this information ranged from 0 to 53.91 percent. The mean for this distribution is not very meaningful due (once again) to a positively skewed distribution (see Figure 3). Given this distribution, the median value of 7.425 of is probably the more meaningful statistic. Dividing the distribution further into quartiles shows that the lowest 25 percent of cases preserved 0 percent of their sending areas. Statistically, programs in the highest quartile have preserved a little more than 25 percent of sending area land. Actual performance in this quartile included programs where 31.23, 32.78, 46.15, 52.81, and 53.91 percent of sending area land has been preserved.

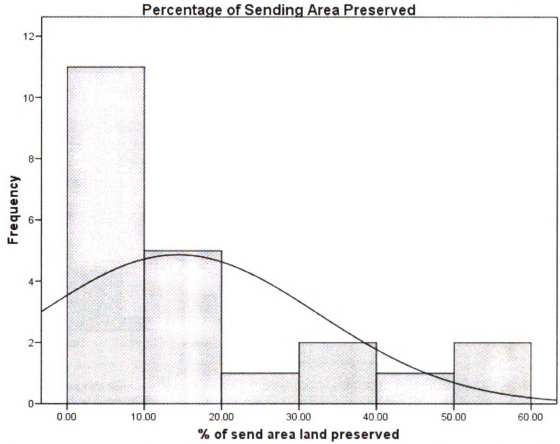

Figure 2: Histogram showing distribution of acres preserved expressed as percentages of sending areas.

Normalized by total land

Percentage of total land preserved (PTLP) ranged from 0 to 14.27 percent for 35 cases shown in Figure 3. The distribution was positively skewed (again) and the mean of 1.63 percent may not reveal as much about these outcomes as does the median of .16 of a percent. Most programs have preserved less than 1 percent of their total land area through TDR. In fact, only the top 25 percent reported preserving more than 1 percent of their total land area through TDR. Within the top quartile, programs reported 1.10, 1.14, 3.18, 3.59, 5.13, 5.72, 7.09, 12.93, and 14.27 percent of total land area preserved.

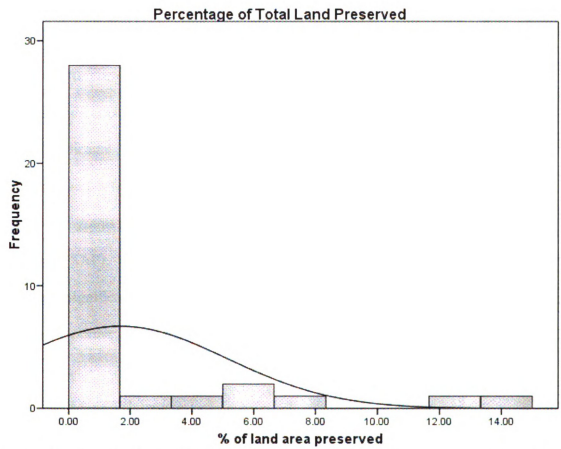

Figure 3: Histogram showing the distribution of acres preserved expressed as percentages of the total land mass of individual communities/jurisdictions. The distribution does not include the outlier datapoint.

Program administrator opinion

In addition to the indicators of program performance described above, program administrators were asked whether or not they believed that their TDR programs were "working" (see Appendix, 2007 Nationwide Survey, Question 7.2). The majority of the 50 respondents believed that their programs were. In fact, 33 program administrators responded "Yes" versus 17 who responded "No."

Mann-Whitney was subsequently conducted to examine the relationship between "yes" and "no" responses to the question "Is your program working?" and other indicators of program performance. The first was acres preserved. Acres preserved data were placed into "yes" and "no" groups and the test was run. The results demonstrate a statistical difference between the two groups ($p < 0.001$). "Working" programs where "yes" was indicated have a much higher mean rank than "not-working" programs where "no" was indicated (23.38 versus 8.75).

Next, Mann-Whitney was used to examine the relationship between these same two groups of programs (working and not-working) and the percentage of sending area acres preserved (PSAP). Results were similar to those of the previous test: there is a statistically significant relationship between working/not-working programs and PSAP ($p < 0.001$). Working programs had a higher mean rank than not-working programs (23.04 versus 8.33).

Another Mann-Whitney test was conducted to examine the relationship between working/not-working and the percentage of total land preserved (PTLP). Results were similar to those of the previous test: there is a statistically significant relationship between working/not-working programs and PSAP ($p < 0.001$). Working programs had a higher mean rank than not-working programs (14.47 versus 5.14).

Finally, Mann-Whitney was used to examine the relationship between program administrator opinion and the number of transactions. As is the case for indicators related to the extent of preservation, the number of transactions is statistically related to working/not-working programs. Specifically, working programs had a much higher mean rank than not-working programs (23.91 versus 9.29, $p < 0.001$).

4.3 Success Factors

Success factors (conditions, practices, and policies contributing to or detracting from TDR program performance) were evaluated against success indicators developed above. Because percentage of total land preserved (PTLP) is the only quantitative indicator that can be used to describe performance for most cases (see Chapter 5 for more discussion), it was used as the response variable against which success factors were analyzed.

Level

Local/county classification was used to delineate two groups of programs: programs administered by local governments in smaller jurisdictions, and programs administered by county governments in larger jurisdictions. A Mann-Whitney test of number of acres preserved by TDR programs operated by local governments (cities, townships, etc.) and the number of acres preserved by programs operated by counties confirms that there is a statistically significant difference between the two at $p < .05$ (See Appendix _____). This suggests that local programs do, on average, preserve fewer acres than county-wide programs.

To determine whether programs operated at the local or county level influenced the percentage of sending area preserved, PSAP was divided into classes based on local or county administration and Mann-Whitney performed. The results of this test failed to demonstrate any statistically significant difference between PSAP for local and county

governments ($p > 0.10$). To determine whether programs operated at the local or county level influence the percentage of total land area preserved, PTLP was divided into classes based on local or county administration and Mann-Whitney performed. Again, the results of this test failed to demonstrate any statistically significant difference between PTLP for local and government governments ($p > 0.10$).

Mandatory vs. voluntary

TDR programs that are mandatory or voluntary are defined loosely in the literature (see Chapter 1: Introduction). For the purposes of this study, mandatory programs are those which 1) will not allow developers to increase density without first acquiring development rights **and** 2) downzone sending areas. While nearly 60 percent of all programs indicated that TDR was the only way to increase density in receiving areas, 36.2 percent reported that sending areas were downzoned, and only one third of the 36 programs responding to these questions programs were found to operate "mandatory" programs according to definition used in this study.

Using Mann-Whitney, no statistically significant difference was observed in percentage of total land preserved by mandatory versus voluntary programs. A Mann-Whitney test was also used to test the significance of downzoning sending areas. No significant difference was observed between percent of total land preserved (PTLP) for programs that downzoned sending areas and those that did not. The second, and final, component of the mandatory/voluntary variable was similarly tested. In this case, however, the difference in PTLP for programs that only allowed added density in receiving areas through the use of TDR and those that allowed added density through other means was statistically significant at $p < 0.10$.

Total land area

TDR implementation varies considerably, and so do the characteristics of the places where these programs operate. The geographic extent of communities with TDR programs surveyed here range from 2,310.4 to 2,564,966.4 acres (see Figure 4). Outcomes for smaller jurisdictions could reasonably be expected to diverge from those of larger jurisdictions. After all, an urbanized township will likely have less developable land to preserve through TDR than a large rural county.

Because both variables are continuous, the influence of total land area on PTLP and PSAP was analyzed using bivariate correlation. First, the correlation between acres preserved and total land area was conducted. Results of the test demonstrate almost no correlation between these two variables ($r = .004$, $p > 0.10$ for two tail).

Correlation between percentage of sending area preserved and total land area produces a very weak and statistically insignificant, positive correlation between the two variables (PSAP) by TDR ($r = 0.034$, $p > 0.10$).

Purchase of development rights

Thirty-six percent of the 45 TDR programs responding to this question indicated that a purchase of development rights program was operating within the same jurisdiction or community. To analyze the affect of PDR on TDR program performance, the difference between percentage of total land preserved (PTLP) for TDR programs with and without PDR was examined using a Mann-Whitney test. The mean rank for TDR programs without PDR was higher than TDR programs with PDR, and test results fail to demonstrate any statistically significant difference between these two samples ($p > 0.10$).

TDR bank

Nearly 80 percent of the 48 programs responding to the question concerning TDR banks did not indicate that their program used a TDR bank. The influence of TDR banks on the PTLP was conducted using Mann-Whitney. The mean rank for TDR programs with TDR banks was higher than TDR programs without TDR banks, but the difference was not statistically significant ($p > 0.10$).

Number of initiators

The number of initiators range from 1 to 5 (5 was the maximum possible). For the 44 programs responding to the question about initiators of TDR, the most frequent number of initiators reported was 2, accounting for slightly more than 30 percent of all responses. The second most frequent response was 1, and the least frequent was 5.

The influence of the number of initiators on the percentage of total land preserved (PTLP) was analyzed using two different tests. Bivariate correlation failed to reveal a statistically significant relationship between the number of initiators and PTLP. The second test using Mann-Whitney found a statistically significant difference between the number of initiators for programs where administrators indicated that their programs were working. A higher mean rank for this group versus the not-working group implies that larger numbers of initiators are related to programs that program administrators consider to be working.

Programmatic goals

The number of programmatic goals ranged from 1 to 4 (5 was the maximum possible). Possible responses to the goals question include 1) "Preserve the character of rural communities, preserve agricultural land and open space"; 2) "Preserve historical sites"; 3) "Protect wetlands, wildlife habitat, ground/surface water quality"; 4) "Direct

population growth toward existing urban communities, increase variety of residential settings, achieve efficient use of existing infrastructure, balancing development over an entire jurisdiction/metro/region"; and 5) "Create affordable housing." The most frequently reported number of programmatic goals was 2, accounting for nearly 45 percent of responses. The next most frequent response was 3, accounting for 35 percent of responses. Only 6 percent of respondents indicated that their TDR program addressed 4 goals, and no respondents indicated that their program pursued all 5.

The influence of the number of programmatic goals on the percentage of PTLP was analyzed using the same procedure as the number of the initiators variable: bivariate correlation was conducted to test the relationship between number of goals and PTLP, and a Mann-Whitney test was conducted to detect any statistically significant differences between samples classified as working or not-working. The correlation did not yield any statistically significant relationship between the number of goals and PTLP. The Mann-Whitney failed as well to identify any statistical difference between working and not-working groups.

Age of program

For the 47 programs that provided the number of years their program had been in existence, the mean number of years a TDR has operated is 18.23 and the median is 17.00. Bivariate correlation between number of years and percentage of total land preserved (PTLP) did not yield any significant relationship between these two variables. The results of the Mann-Whitney test, however, demonstrated some evidence a relationship between the age of programs and program administrator opinions of success ($p = 0.083$). The working group exhibited higher mean rank than did the not-working

group suggesting that programs which administrators consider to be working are associated with comparatively higher values for PTLP.

5 Discussion

In this chapter, the author interprets findings presented in Chapter 5: Findings, and places them in the context of efforts to understand TDR success factors and indicators. Establishing a reliable and meaningful variable or set of variables that capture the performance characteristics of larger samples of TDR programs has been an elusive endeavor. While many case studies use various indicators to describe the performance of individual programs, researchers have not consistently applied indicators to larger samples of cases. Several researchers, whose works are discussed above in Chapters 1 and 2, have even suggested that no single indicator or set of indicators can be meaningfully or fairly applied across larger samples of TDR programs because programs vary so greatly in their implementation (Walls and McConnell, 2007; Machemer and Kaplowitz, 2002). The following addresses these concerns and identifies key issues emerging analysis of data collected for this study.

5.1 How is TDR success best measured?

Analysis of the distribution of the number of development rights transferred casts doubt on the utility of the number of development rights transferred as an indicator of success for larger samples of TDR programs is suspect. While it may be useful for examining individual programs in isolation, wide variation between rates of transfer between programs creates a very dispersed dataset and undermines the explanatory value of this indicator across a larger number of cases. In fact, transfers may not be a reliable indicator of anything other than program activity over time for a single program.

Even if number of rights transferred and number of transactions data measured the same thing for all cases, they still might be of limited explanatory value because the

relationship between the number of development rights transferred or development rights transactions and the number of acres preserved is not necessarily direct. McConnell et al. (2003) observe that the number of transactions does not appear to have any direct, linear relationship with the number of acres of agricultural land preserved in Calvert County in a given year. In some situations years with high numbers of transfers correspond with years of relatively low levels of preservation. The number of rights severed from sending areas varies and so does the lag between severance of rights and final recordation of permanent conservation easements. In either case, TDR programs differ so much in their implementation that it would be quite difficult to generalize anything from the number of rights severed from sending areas or the number of transactions.

Perhaps a better measure of success is provided by indicators that directly describe progress made toward the primary objective of most TDR programs—preservation of land, buildings, and the like. Indicators that enumerate the extent of preservation are arguably the most telling measures of performance and possibly the most universal. As discussed above in Chapter 2: Measuring Success, they appear very often in literature devoted to growth management, land preservation, and TDR.

The 36 programs reported a total of 149,276 acres preserved. Those acres represent land that presumably would not have been preserved any other way. For TDR programs with very focused preservation goals (for the example open space on a particular hill in Greenville, South Carolina) preserving even a few acres can represent substantial progress made in the pursuit of those goals. Looking strictly at absolute acreage preserved, it appears that a few programs are performing well and preserving nearly 100 percent of all the land preserved, while the rest have preserved very little.

But looking at acres preserved as **the** measure of program success oversimplifies interpretation of these findings and obscures important differences between programs. Acres preserved does not allow for fair comparisons between programs with different land areas, and all of these programs have different land areas. How, for example, can the performance of TDR in Morgan Hill, California (total land area 11.67 square miles) be fairly compared with the performance of TDR in King County, Washington (total land area 2126 square miles)? King County has more land to preserve, more choices of sending and receiving areas, and thus more opportunities to find optimal sending/receiving area characteristics. Statistically, programs administered by localities preserve fewer acres than do programs administered by counties—when preservation is measured in absolute terms.

Percentage of total land area preserved

But programs vary widely in their programmatic goals and the land resources with which they are endowed. Brabec and Smith (2002) define acres preserved in their study of land preservation techniques as the ratio of the number of acres protected versus the number of acres targeted for protection (p. 261). This, they contended, allows comparisons to be made between programs that work with different land resources. For this study, percentage of total land preserved (PTLP) and percentage of sending area preserved (PSAP) have been introduced to provide measures of program performance that allow for comparisons between programs with different programmatic goals and geographic characteristics. Looking at both of these normalized indicators, the apparent advantage enjoyed by larger jurisdictions quickly dissipates: the local versus county dichotomy has no statistical effect on the median PTLP or PSAP. This suggests that the

normalized indicators, PTLP and PSAP, could allow for comparisons to be made between the performance of programs administered at different levels of government and across disparate geographic contexts. To further test this conclusion, the author examined bivariate correlations between total land area and normalized preservation indicators. There are no statistical relationships between total land and PTLP or PSAP. While a greater abundance of land can obviously increases the extent of preservation in absolute terms, it does not appear to make programs more successful at preserving land.

Figure 4 depicts a scatterplot of total land area against PTLP for each of the 36 programs reporting this information (including the outlier). The Y-axis represents the total land area of communities/jurisdictions administering TDR, and the X-axis represents percentage of total land preserved for each program. The distribution of datapoints clusters around coordinates 0,0 which speaks to a preponderance of inactive and underperforming programs. More interesting, however, are the cases located near the X-axis, extending from the Y-axis to the highest PTLP value—14.27%. Many of these programs are administered locally by small cities, towns, and townships. For example, the community that has protected the highest percentage of its land area is Claremont, California having transferred development rights from 1200 of 8409.6 total acres. The second highest PTLP belongs to the well-studied TDR program administered by Calvert County, Maryland. Aside from this case, larger counties are underrepresented among programs that have protected higher percentages of land. Some of the smallest jurisdictions (geographically) have managed to protect greater portions of their land mass than have the largest county administered programs.

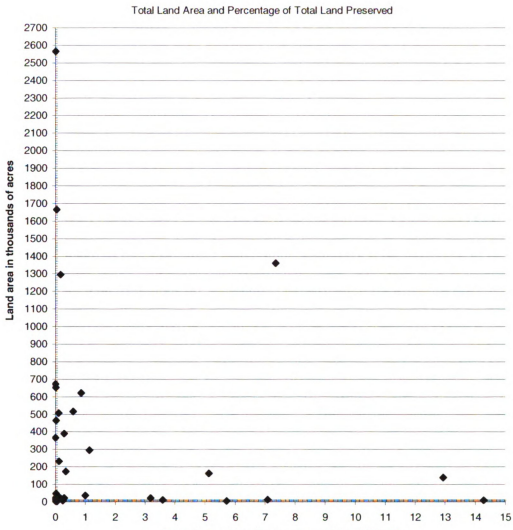

Figure 4:The X-axis represents total land area, the y-axis represents percentages of total land area preserved by TDR. Smaller communities/jurisdictions are plotted closer to the X-axis due to their smaller land area while programs protecting smaller percentages of their total land area are plotted close to the Y-axis.

Percentage of sending area preserved

In some ways, percentage of sending area preserved (PSAP) has much to offer as an indicator of program success. For one, it addresses the fact that (for better or worse) individual communities define their own measures of success when they formally implement TDR and other land use management techniques through ordinances, comprehensive plans, and other regulations. In an effort to draft laws and regulations that

reflect their public interest, it is assumed or hoped that communities will have undertaken intensive research and public outreach in the process of crafting these policy instruments. Local knowledge and technical resources can enable communities to establish and pursue goals that make the most sense for in each case. So it is conceivable that when communities define preservation and other goals, those goals may or may not coincide with other indicators that may be useful for the purposes of evaluating TDR. Percentage of total land preserved (PTLP) provides an indicator of program performance that can be equally applied across many different geographic contexts, but its advantage in this regard is also its flaw for it does not take into consideration the validity of the goals that have been defined by individual communities. This is particularly a problem where TDR is used to protect very specific resources. This is the case for communities like Morgan Hill, California and Greenville County, South Carolina. Both have used TDR to protect ridgelines and hillsides. Achieving these goals is, or was, important to these communities, but the significance of program success might be ignored by indicators that use measures like PTLP. Measuring success as the percentage of sending area preserved addresses this problem because sending areas are assumed to reflect community priorities and values.

Nevertheless, there are several problems with this indicator. First and foremost, not all programs designate sending areas. Second, even when respondents indicated that their programs designated sending areas, some were not able to provide reliable data. The effect of both of these conditions is that only 22 respondents reported the size of sending areas.

Different programs designate different amounts of land for preservation. Not every program designates 86% of its entire land area as eligible to transfer development rights as is the case in Blue County, Minnesota where approximately 414,000 of 481,000 acres are eligible to participate in the county's TDR program. Using percent of sending area preserved facilitates evaluation of progress toward individual program goals, but it does not say as much about overall success of TDR as a land use management technique.

Normalizing preserved acreages by the total land area of the community/administrative jurisdictions in which they are located cannot overcome the problem of persistent 0's, but it does relieve investigators from the need to collect accurate measurements of sending areas. Data defining the total land area of counties, cities, and townships is readily available through the U.S. Census Bureau. Because the data is collected using one methodology at one point in time (during the decennial census), it represents the same information in all cases and allows for comparisons to be made between a larger number of programs that design TDR to address different goals around different expectations for future land use.

Program administrator opinion

Researchers have used the opinions of program administrators to measure program success. Machemer et al. (in press) found that roughly 40 percent of respondents indicated that they believed their programs were "working successful." These researchers do not elaborate on what exactly is meant by a TDR program that is working successfully, and the reader is left wondering just exactly what has led these program administrators to characterize their programs as successful or not successful, working or not-working.

The same question was asked of respondents for the study undertaken here, but with some different results. The author finds that two-thirds of program administrators believe their programs are working. Several respondents stated that they believe their program to be working but issued several caveats when asked to explain their answers. In almost 10 instances respondents qualified their answers by commenting on the pace at which their programs were achieving goals. The sentiment seemed to be that TDR programs are working slowly but surely, and several respondents felt that TDR could be more even more successful if known deficiencies were addressed. Respondents from both groups, those who indicated that their programs were working and those who indicated that their programs were not working, identified a number of problems that either reduced the efficacy of TDR in their communities or prevented it from succeeding altogether. Common themes include

- Expanding sending and/or receiving areas in order to create more opportunities for transferring and using development rights
- Identifying other programs and policies that compete with or allow circumvention of TDR
- Pursuing complementary preservation programs, especially purchase of development rights
- Creating a TDR bank for the purposes of tracking transactions and facilitating marketing of the program
- Enacting policies to discourage use of DR's in sending areas

The information provided by respondents through the survey process is not doubt illuminating and raises interesting questions concerning the operation of TDR programs

in communities throughout the United States. But as an indicator of program success, the opinions of program administrators would seem to be highly subjective and potentially unreliable. After all, program administrators may not themselves know how to accurately assess the performance of the own programs. It is reasonable to suspect that some administrators may not answer this question honestly. The results of statistical tests described in Chapter 4: Findings offers evidence to the contrary. Comparing working/not-working responses with four other success indicators (acres preserved, percentage of total land preserved, percentage of sending area preserved, and transactions), this study finds that in each instance program administrator opinion is related to tangible measures of success. Program administrators who believe the TDR is successfully achieving program goals are statistically more likely to be involved with TDR programs that are preserving more land than programs where administrators do not believe that TDR is achieving its goals. In short, there is evidence presented here that administrator opinion appears to be a reliable indicator of program success and that administrators are forming opinions based in the objective measures of program success.

5.2 What makes a program successful?

Level

As discussed above, a higher level of government is significantly associated with higher median acres preserved when acres preserved is measured in absolute terms. But this finding does not hold for either of the normalized indicators (percent of sending area preserved and percent of land area preserved). This suggests that the influence of the level at which TDR is administered has more to do with the geography typically associated with these levels. County government, particularly those in the western United States, administer programs over thousands of square miles compared to localities

which administer TDR for much smaller geographic extents. With more acres to protect, it is not altogether surprising that county TDR programs have preserved more land than localities.

To some, part of the appeal of TDR as an instrument of land use policy is its flexibility. Because programs can be tailored to the needs of the communities they serve, Johnston and Madison (1997) note that TDR is "versatile", able to accommodate "complex or relatively simple designs according to the sort of program needed (p. 376). Other researchers have asserted that level of government responsible for administration of TDR can affect program success. Barrow and Prenguber (1975) suggest that programs administered at the county level would be at a disadvantage insofar as a county planning would have to structure a TDR program around the exigencies and complexity of a very large real estate market or markets. An effective program would require accurate forecasting and land use planning and the difficulty involved in accurately interpreting patterns in real estate markets and predicting the locations of future urbanization could potentially thwart efforts to use TDR to channel development toward socially desirable outcomes across large geographies.

While conducting interviews, some respondents suggested that, quite to the contrary, TDR programs should be administered at the county level. As some researchers have argued, TDR can be complex, requiring substantial organizational resources that may simply be beyond the means of local governments with limited staff and technical resources (Wassmer, 2005; Pizor, 1987). In addition, for TDR to achieve goals of directing urbanization away from prime agricultural land or pristine wildlife habitat and toward existing urban centers, it may have to operate across and between the boundaries

of local jurisdictions. A TDR program administered by a county has more options for locating receiving areas.

Results of the research presented above suggest that it may not be critical for TDR to be administered by counties. Acre for acre, locally administered TDR programs have preserved higher percentages of their land mass than have many of their larger counterparts.

Mandatory vs. voluntary

As discussed above, the distinction between mandatory and voluntary TDR programs is more nuanced than the two terms might imply. Mandatory programs do not require landowners to transfer development rights, but they do require developers to use them. Development rights may be required for all development (usually residential), they may be required to increase densities beyond that allowed by current zoning classifications, or they may be required to certain types of development. The highly successful program in Pitkin County, Colorado, for example, requires development rights for newly constructed single family homes and additional development rights for construction beyond square footage specified in their zoning and building codes.

Another aspect of mandatory programs is that they tend to downzone sending areas—significantly. Doing so does not force a landowner to sell development rights, but makes doing so much more attractive to the landowner than it would have been before downzoning. Although less than 40 percent of programs in this study reported that their programs had downzoned sending areas in connection with their TDR programs, several respondents emphasized the importance of downzoning.

Both of these factors were used to operationalize the mandatory/voluntary variable. Programs had to have downzoned sending areas while **requiring** TDRs for added density in receiving areas—density could not be added in receiving areas using any others means except for affordable housing exceptions. Mandatory programs did not exhibit any statistical influence on the percentage of total land preserved; neither did downzoning sending areas when analyzed separately. Requiring TDRs for adding density in receiving areas, however, did demonstrate a statistically significant influence on the percentage of total land areas preserved. This coincides with literature that has often emphasized the importance of properly siting receiving areas in order to take advantage of local real estate market conditions and designing incentives that encourage developers to shift their attention toward receiving areas capable of developing or redeveloping at higher densities.

Purchase of Development Rights

Purchase of development rights programs are common throughout the United States as a land conservation technique (Daniels, 2000; Daniels and Lapping, 2005; Machemer and Kaplowitz, 2002). As such, they can be used to complement TDR programs to maximize land preservation outcomes:

> By utilizing PDR funds strategically (e.g. purchasing conservation easements in a ring or buffer zone), communities may use limited PDR funds to help maximize their efforts to preserve open space, agricultural lands, and historic areas. TDR, with its use of private funds and market pressures, can strengthen communities' land preservation efforts by placing additional conservation easements throughout a TDR sending area, perhaps strengthening or widening the 'buffer'. (Machemer and Kaplowitz, p. 790)

Montgomery County, for example, has used its PDR program to create a buffer around its agricultural reserve boundary line (p. 790).

In the New Jersey pinelands, on the other hand, TDR and PDR programs have not been used in an integrated manner: despite the success of the TDR to preserve nearly 30,000 acres, PDRs had not been used within pinelands sending areas (p. 790). Commenting on land preservation programs in Montgomery County and Southampton, New York, Brabec and Smith (2002) argue that multiple strategies working in concert with one another can achieve much better results than one technique alone (p. 264). More recently Machemer et al. (in press) find a statistically significant relationship between TDR programs operating in areas with PDR and program administrator opinions of success.

Results of quantitative analysis in this study find no such statistical evidence to support the opinion that TDR benefits from the operation of PDR within the same community/jurisdiction. Responding to a question regarding the effect of PDR on their TDR program, some respondents did suggest that PDR can be beneficial for several reasons. One program administrator stated that PDR "compliments [TDR] by achieving open lands in areas where the [TDR] program is not operational or where land owners do not desire to use development rights." In another case the respondent suggested that the effect work in the opposite direction: the respondent indicated that TDR filled in where a county PDR program alone was unable to complete a system of continuous greenways and blueways. Despite comments like these, programs with PDR did not preserve more land than TDR programs without PDR—at least not statistically. The relationship

between PDR and TDR is a matter of ongoing consideration in the literature and in this study, remains ambiguous.

TDR bank

Case studies and other TDR research often speak of the beneficial role played by TDR banks. TDR banks, according to Machemer and Kaplowitz (2002), perform a variety of functions including facilitating transactions of TDRs, acting as a buyer of last resort, and strengthening program credibility with banking institutions (p. 789). The highly successful Montgomery County program used a TDR bank to facilitate transactions, matching potential buyers and sellers. In the Pinelands, two TDR banks play very prominent roles in the administration, marketing, and implementation of the Pinelands TDR program.

Respondents to the survey presented here also believed that TDR banks were important for successful program outcomes. In at least two cases, respondents indicated that TDR banks facilitated the launch of their TDR programs. Both programs have preserved significant amounts of land, and in the case of King County, Washington the success of the program is undeniable. Through the TDR bank there, approximately 100,000 acres of land have been preserved and it is hoped that the banked development rights can be used to create a self-sustaining preservation program as rights are sold to private buyers. Another respondent expressed the opinion that TDR banks also provide a single repository for unbiased TDR information.

These statements closely correspond to ideas found in TDR research. In one of their studies of the TDR program in Calvert County, Maryland, McConnell and Wall (2003) observed a strong relationship between market activity measured in terms of numbers of

transactions, rights transferred, and acres preserved and the activities of the County to acquire and bank development rights. Others have referred to this function of TDR banks as "priming the pump." For McConnell and Wall, priming the pump by acquiring available development rights supports greater market fluidity and by giving buyers and sellers confidence in market prices.

Given the comments made by interviewees regarding the benefits of TDR banks, and the importance accorded to it in scholarly literature, it came as some surprise to the author of this study that no significant statistical relationship was observed between programs with TDR banks and higher levels of preservation. Indeed, only 7 of the 35 interviewees responding to this question (the outlier was not considered in this test) reported having a TDR bank. Only 3 locally administered programs used a TDR bank, but one of them does possess the second highest number of acres preserved (898), the third highest percentage of sending area preserved (23.21%), and the second highest percentage of total land area preserved (7.09%). What is more, this program located in Warwick, Pennsylvania is relatively new compared with its peers. What it has accomplished in 14 has taken some of the other programs much longer.

Among county programs, King County, Washington and Calvert County, Maryland were ranked first and second in number of acres preserved. As mentioned previously, both programs have TDR banks. Two other county administered programs with TDR banks (Summit County, Colorado and Burlington County, New Jersey) also occupied positions among the 10 ten "acres preserved" programs. Given these successes, it appears that the difficulty ascertaining the value of TDR banks across a large number of cases is not so much that TDR banks have failed to achieve higher rates of preservation

where it has been used, but rather the fact that it simply has not been used very often at all.

Number of initiators

Several researchers have emphasized the importance of public support for TDR and its goals and objectives (Pruetz 2007, 2003; Machemer et al. 2007). The cooperation of farmers and other sending area landowners is crucial if there is to be an adequate supply of development rights made available to developers in receiving areas. As discussed above, the public support for TDR among receiving area residents is just as important (and challenging) as finding receiving areas capable of absorbing higher density. Initiators are individuals and groups who advocate for, support, and in some cases even implement policy. In their recent study of TDR nationwide TDR programs, Machemer et al. (in press) observe that 42.1% of programs indicated that "farmers and ranchers" were among iniitators; 42.1% indicated that "non-farm landowners and residents" were among initiators; perhaps surprisingly, 49.1% reported that "developers and builders" were among initiators; 57.9% reported that "preservationists and non-profit organizations" were among initiators. And, as might be expected, a high percentage of respondents reported that "government agencies, officials, and planners" were among program initiators (p. 13).

Using a chi-square, their research finds a statistical relationship between the participation of preservationists and public agencies/officials/planners and program success (as measured by program administrator opinion of program success. They also identify a relationship the number of initiators and opinions of success. In this case, 2-3 initiators were found to be statistically related to program administrators' opinions of

success. These results suggest that in the case of public participation, more is not always better—in least in an unqualified sense.

Results of a Mann-Whitney presented here support these findings. Programs considered to be working by program administrators were associated with higher numbers of initiators than programs that were identified as not-working.According to Machemer et al., public support is important for TDR both as an indicator the *value of a resource to be protected* as well as the political support for actions taken to protect those resources.

Age of program

In a 2006 study, Wassmer found that time can affect the performance of urban containment programs. For states like Florida which require vertically, horizontally, and internally consistent growth management, a "10-percent increase in the number of years on the plan is expected to reduce the [size of a UA] by 0.4 percent [...] from what they would have been without the state-imposed growth management regime" (p. 56). Wassmer continues to state that for the "typical U.S. UA in year 2000, every 10-percent increase in the years [a restrictive form of local urban containment] is present is expected to decrease the urban area's size by -0.12 (p. 56).

In the case of TDR and the effect of the length of time that a program has been in operation, research presented in this paper suggests that there is some statistical difference in program tenure between programs that are working and those that are not. The significance level of this difference does not allow for too much to be inferred ($0.10 < p < 0.05$), but given the correspondence between this finding and existing literature there is reason to pursue further study of this factor.

6 Conclusions

Many observers have commented on the increasing number of TDR programs throughout the United States. Rick Pruetz estimates that 181 TDR programs currently operate in 33 states. Though there is some question concerning an exact number, TDR has undoubtedly contributed to efforts to curtail unplanned exurban growth, protect natural resources and working landscapes, and (in a few cases) stimulate economic growth and redevelopment of urban areas.

Nevertheless many questions regarding the characteristics of TDR programs have gone unanswered despite a growing body of case study research. This is likely due to the fact that few if any comprehensive, empirical investigations of TDR have been conducted. Case studies have thoroughly examined a limited number of programs, but have not engaged broader issues surrounding TDR. Because existing research has avoided evaluating a larger sample of programs, very little is known about the vast majority of the 181 programs identified by Rick Pruetz and others. Little is known about how these programs operate, and how successful they have been at achieving their goals. Without a better understanding of the programmatic features and outcomes of these programs, TDR is open to the criticism that some 30 years after its conception it remains experimental, unproven, and unreliable.

This study has attempted to directly address some of these issues. It has collected an analyzed data from a larger number of programs representing diverse institutional, geographic, ecological, and socioeconomic contexts, than previously attempted. It has also sought to assess and recommend new methods with which TDR and other growth management programs might be evaluated.

6.1 Key findings

What defines TDR success?

One of the primary purposes of this research is to "identify program features or success factors that are statistically related to program success." To do this, success indicators had to be derived. Five different indicators were analyzed. *Acres preserved* is the most commonly used measure, but this study finds that there are advantages to normalizing this metric. In the case of *percentage of total land preserved* or PTLP, normalization allows disparate programs to be comparatively evaluated. This means that larger samples of programs can be fairly and objectively analyzed. Researchers might finally be able to learn and apply the knowledge gathered from the experiences of highly successful programs like those in Montgomery and Calvert County, Maryland.

Another normalized metric is of some interest too. *Percentage of sending area preserved* (PSAP) offers a greater degree of sensitivity to local conditions, preferences, and land use choices. Sending areas, after all, should reflect the priorities and values of the communities that designate them—they are an indication of the *value placed on a given preservation resource*. Measuring program success as percentage of sending area land preserved can reveal a lot about progress made in the direction of achieving goals founded on these values. Unfortunately, it is not always easy to obtain accurate measurements of sending areas and not all TDR programs designate them in the first place. This limits the utility of PSAP as a measurement that can be applied as broadly as the percentage of total land area preserved.

Finally, recent research has used program administrator opinion and perception of program performance as an indicator of success. Replicating to some degree past

research by Machemer et al. (in press), research presented here finds some justification for using this as an indicator of success. Based on its relationship to the quantitative measures just described, there is reason to believe that program administrators are accurately judging the performance of their programs.

What makes a program successful?

Results of this study found statistical relationships between success factors and indicators in only several instances: the number of program initiators, whether a program allows added density through mechanisms other than TDR, and the age of the program all demonstrated relationships with the percentage of total land preserved or working/not-working response variables.

The importance of public involvement in TDR success has been argued in many previous studies of individual programs (Tustian, 1983; Pruetz, 2007, 2003), and the number of program initiators has been identified as a significant variable affecting program administrators' opinions of program success in studies of larger samples of TDR programs (Machemer et al., in press). This study further documents that relationship by examining it against a quantitative measure of program success—percentage of total land preserved.

While the mandatory/voluntary variable was not shown to be significant, one of its two components was. Echoing comments made by program administrators in this study, and the findings of past research, findings presented here did reveal a significant relationship between programs that only **allow** increased density through TDR and higher percentages of land preserved. The converse of this is equally important: programs with

permissive policies that allow TDR to be circumvented are less successful at preserving land.

Age of program is a new variable in TDR research, but one that has been examined before in the growth management literature (Wassmer, 2006). Machemer and Kaplowitz (2002), Machemer et al. (in press), and Pruetz (2003) discuss different historical waves of TDR but the effects of the number of years that a program has operated had not been examined before. Although the relationship between the number of years and whether (according to responding program administrators) a program is working was only significant at $p < 0.10$, it provides some evidence that older programs are more successful. Understanding why this is will have to be taken up in future research.

To the surprise of the author, several success factors were not found to be significant contributors to the performance of TDR programs. Both TDR banks and purchase of development rights programs (PDR) have been discussed extensively in existing case studies of individual TDR programs, and they are thought to be important for program success factors. Much of the sentiment expressed by respondents to the survey presented here coincide with this, but the hypotheses that *TDR programs with banks and active PDR programs are more successful than their counterparts* could not be substantiated in this study. At least in the case of TDR banks, this may simply be a result of the fact that relatively few programs surveyed actually use banks. Despite the lack of a statistically significant connection between TDR banks and program success, programs with banks feature prominently among programs preserving the highest percentages of land.

6.3 Policy implications

Information gathered through the survey contains several lessons for policymakers and communities interested in pursuing TDR.

- First, the value public involvement in designing and implementing TDR should not be underestimated by communities pursuing TDR as a part their land use policy. Rick Pruetz (2003) has even suggested that comprehensive plans be designed around TDR. Whether TDR is introduced to a community through the comprehensive planning process or not, planners and other public officials should strive to engage and educate the public if they want to build consensus around the program. Greater involvement means a greater likelihood that TDR will succeed when disagreement does arise.
- Second, TDR programs need to consider the consequences of conflicting as well as complementary policies. Much of the literature has focused on identifying other land use management techniques that complement TDR in mutually supportive relationships. But aside from a few researchers, most notably Rick Pruetz, investigations of TDR have not addressed the negative effects of policies that enable TDR to be circumvented or simply reduce the incentive for stakeholders to use it. When designing a TDR program, policy makers need to seriously consider potential effects of existing policies on the performance of TDR. TDR is fundamentally about choices, and some of those will be difficult but necessary to make.
- Third, communities need to ensure longevity of their TDR programs and consistency of operation over time. Whatever the exact nature of the relationship between success and program tenure, responses from interviewees suggest that the success of a program cannot be left up to the actions of one individual. People come and go,

but programs like TDR stay in place. If institutional knowledge is not passed from one program administrator to the next, it will likely be lost and with it any chance for successful outcomes. In several cases, contact made with a government agency or department revealed that key personnel who were instrumental in constructing a TDR program had left, and in their absence no one was able to respond to questions or advocate for the TDR program. TDR needs to be institutionalized in way that guarantees coherent administration well into the future.

6.4 Further Research

Limitations of this study

Response variable data used in this study presented challenges for statistical analysis. The distributions of acres preserved nand the other indicators based on that data were not normal. More importantly, there is a preponderance of "zero" data that makes multivariate regression problematic. Future research can and should address this issue by using "zero-inflated" regression. The technique facilitate more robust statistical analysis of the relationships between response variables (land preservation) and success factors.

Leadership and institutional capacity

One of the themes that emerged in several interviews was the need to understand the impact leadership and institutional or organizational capacity on program performance. Past research has occasionally alluded to the issue of institutional capacity through discussions of the economic efficiency of TDR. There is, perhaps, a belief that TDR requires greater resources than some communities are able or willing to provide. And indeed, highly successful programs do devote staff and other resources to implementing well-crafted programs that are produced through meaningful (and probably resource

intensive) public outreach and education as well as thoughtful design based on thorough investigation of local real estate markets, environmental conditions, etc. .

Comparisons with other techniques

Pizor (1986) observes that it is not that TDR is a superior technique on its face, but it may be one of the more flexible, capable of adjusting to conditions that would thwart others. Regulatory approaches alone are insufficient. Downzoning alone may run amuck of state and federal constitutions that are increasingly interpreted to protect private property rights at the expense of the public interest. Communities may not be able to afford to purchase conservation easements for everything that they need to protect. Studies that offer comparisons of program performance for a variety of different land use management techniques (like that conducted by Brabec and Smith, 2002) could improve understanding of conditions and program components that make one strategy better than another for a given set of circumstances.

6.5 Preserving TDR

Without a better understanding of TDR and its function across different geographic, social, political, and economic environments, it becomes all too easy to dismiss TDR as an innovation that has been ineffective in many cases. This study certainly documents some serious deficiencies, but to conclude from those deficiencies alone that TDR is somehow fundamentally unable to achieve results would be premature. While many programs remain inactive, a good number have accomplished significant results. The underperformance of these programs does not sully the accomplishments of many others. This study has found that 36 programs of 50 programs reported a total of 149,276 acres preserved. The acres, furthermore, were preserved without incurring the costs associated

with PDR or fee simple acquisition. Placing these successes in context is also important: for programs with fewer resources and little undeveloped land to protect, even modest successes can be quite impressive—especially for the people who live in those communities. In the final calculation of program performance, the ultimate measure of success is the extent to which any program or set of policies fulfills the expectations of those individuals.

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APPENDIX

2007 NATIONWIDE TDR SURVEY

INTERVIEWER: ____Matthew Brinkley_____ DATE: _ _
TIME: _ _

RESPONDANT: _____

PROGRAM NAME: ___ ____

LOCATION: ___ ___

INTRODUCTION AND INFORMED CONSENT

Thank you for taking the time to answer our questions.

We are really interested to learn more about programs that transfer development rights to manage urban growth, and your answers will help us to better understand programs across the United States.

Any personal information you provide will be protected and kept confidential to the furthest degree provided for by the law. Please feel free to provide as much information as you feel is necessary to thoroughly answer the questions.

At any point, if you have questions about the study that I can't answer adequately or to your satisfaction, you can contact Dr. Michael Kaplowitz at (517) 355-0101. If you have questions or concerns about your rights as a study participant, please contact *Peter Vasilenko, Ph.D., Director of Human Research Protections, by phone at (517)355-2180 or e-mail at: irb@msu.edu. I have Dr. Vasilenko's fax number [fax (517)432-4503] or mailing address if you would like those too [202 Olds Hall, Michigan State University, East Lansing, MI 48824-1047].*

We really want to get an accurate and detailed picture of your program. We'll start with some questions about **how you track TDR/TDCs,** then the **background** of your program, then we'll talk about how your community **implemented** the program, its **characteristics**, and last I'll have a few questions about the **results** of your program.

1 Tracking

How are transfers, TDR transactions, and preservation for (NAME OF PROGRAM) tracked or recorded?

_____GIS database

_____Other electronic database (including spreadsheets and similar programs)

_____Planning documents (like reports)

_____Publicly recorded documents (council resolutions, amendments to a comprehensive plan, ordinances, etc.)

_____Only the conservation easement is recorded

_____Other (describe):

Contact Information for individual responsible for maintaining electronic tracking

Name:

Title:

Phone# :

Email:

2 Background

2.2 When did the program begin? _____Month _____Year?
(IS THAT WHEN THE PROGRAM WAS ADOPTED? OR THE DATE OF THE FIRST TRANSFER? WHAT WAS THE DATE OF THE FIRST TRANSFER?)

2.3 Was pressure to develop **RESIDENTIAL / COMMERCIAL / AGRICULTURAL** land **INCREASING**? **STEADY**? **DECREASING**?

Now, I'd like to talk with you about how your community implemented the program.

3 Implementation

3.2 Different communities use different legal or regulatory foundations for TDR, a local ordinance, a comprehensive plan, state or regional legislation, etc. How about your program?

3.3 I'm learning that during the process of creating TDR programs, different groups are often responsible for initiating TDR in their communities. I'm going to mention the names of a few groups. Please let me know if any or all of them were initiators.

Farmers/ranchers? _____

Land owners/residents? _____

Land developers/builders? _____

Environmentalists/preservationists/land conservationists?

_____

Government agencies/officials/planners? _____

Was any one of these groups more responsible for initiating the program than the others? Have we missed anybody?

(Implementation cont.)

3.4 Different communities sometimes use different kinds of studies to design their TDR programs. Did your community use

Land use/land cover change, build-out analysis

_____

Environmental assessment? _____

Community opinion surveys, focus groups? _____

Housing market forecasting, economic forecasts, demographic forecasts? _____

Others? _____

3.5 (ONLY IF STUDIES WERE USED) And do you know who conducted these studies?

PLANNING AGENCY STAFF ALONE/PLANNING AGENCY STAFF AND CONSULTANTS/CONSULTANTS ALONE

Anyone else?

(Implementation cont.)

3.6 TDR programs are often intended to address all sorts of land use issues. I'm going to mention a few sets of objectives or goals, let me know if any these describe your program. Was your program intended to

Preserve the character of rural communities, preserve agricultural land and open space? _____

Preserve historical sites? _____

Protect wetlands, wildlife habitat, ground/surface water quality? _____

Direct population growth toward existing urban communities, increase variety of residential settings, achieve efficient use of existing infrastructure, balancing development over an entire jurisdiction/metro/region? _____

Create affordable housing? _____

Was one of these more important than the others? _____

3.7 (ONLY IF YOU HAVE INDICATED THAT YOUR COMMUNITY HAS A COMPREHENSIVE LAND USE PLAN) Are any of these objectives addressed in your community's comprehensive land use plan? (If possible, please indicate in which section/chapter they might be found).

(Implementation cont.)

3.8 Is a TDR bank part of your TDR program? **Y / N**

3.9 How does the TDR bank work?

3.10 And in your opinion, what if anything is the impact of the TDR bank on your program?

Now I'd like to talk a little about the characteristics of the areas where your community transfers development rights from -- the sending area or preservation zones.

4 Sending Area Characteristics

4.2 What was the total size of the area designated as the sending area(s) when the TDR program began? _____ Acres _____ Square Feet

4.3 Has your program determined total potential development rights for each sending area?

NO, my program determines/allocates development rights/credits at the request of a landowner/developer/etc. **(SKIP TO 4.6)**

4.4 If yes, how many development rights were originally allocated to these sending area(s)? _____

4.5 And do you know **how** the rights were allocated?

4.6 To date, how many TDRs have been transferred? **(HOW MANY INDIVIDUAL TRANSFERS, HOW MANY UNITS OR RIGHTS)**

Rights or Units (please specifiy appropriate unit):

_____

Transactions: _____

4.7 And do you know how many **acres/square feet** have been preserved in the sending area/preservation area?

4.8 How was the sending area zoned before your program began?

And after?

(Sending Area Characteristics cont.)

4.9 (ONLY IF YOUR COMMUNITY HAS A COMPREHENSIVE PLAN) Is the sending area or areas designated in your community's comprehensive land plan? (If possible, please indicate in which section/chapter they might be found).

Now I'd like to talk a little about the characteristics of receiving areas in your TDR program.

5 Receiving Area Characteristics

5.2 When your program (began, what was the size of the receiving area(s)?

Acres: _____

Square Feet: _____

5.3 How was/were the receiving areas zoned before your program began?

And after it began?

5.4 Is TDR the **ONLY** way for developers to obtain greater density? Please explain.

5.5 How many TDR development projects have been initiated/completed in receiving areas using TDRs? _____

How many TDR rights or credits have been used in those projects?

_____/project

_____total

5.6 (ONLY IF YOUR COMMUNITY HAS A COMPREHENSIVE PLAN) Is the receiving area or areas designated in your community's comprehensive land plan? (If possible, please indicate in which section/chapter they might be found).

Now that we've discussed a few of its characteristics, I'd like to ask you about some of the features of your TDR program and other land conservation/growth management programs in your community - like PDR for instance.

6 Complementary Programs

6.2 In some communities, TDR programs accompany other programs that preserve land by purchasing development rights. Is there any kind of PDR (or purchase of development rights) program in (NAME OF COMMUNITY)?

6.3 (IF YES) In your opinion, what if anything is the impact of the PDR program on your TDR program?

O.k., we're almost finished. Your comments have been really interesting; I just have a couple more things I'd like to ask you about how your program is doing.

7 Measures of Success

7.2 So in your opinion, is your TDR program working?

Is there any one thing that you could change to improve the program, what would it be?

That concludes the survey. Again, I'd like to thank you for taking time out of your busy schedule to assist me with this research. Please include any additional comments here.

Again thank you very much. When the results of our research are published eventually, we will be happy to make a copy available to you. If you think of anything else that you want to add, or have any questions, don't hesitate to contact me at Brinkley@msu.edu, or you can contact Dr. Michael Kaplowitz at.

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