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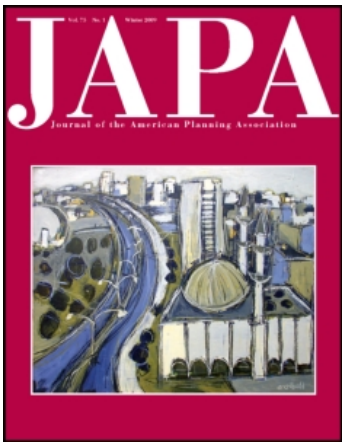

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What Makes Transfer of Development Rights Work?: Success Factors From Research and Practice

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What Makes Transfer of Development Rights Work?

Success Factors From Research and Practice

Rick Pruetz and Noah Standridge

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Problem: Over the last four decades, at least 20 authors have identified various components thought to be necessary for effective transfer of development rights (TDR) programs. However, the factors most commonly cited in these articles have not yet been isolated and systematically compared with a substantial number of TDR programs that have accomplished meaningful preservation results to date.

Purpose: This article is intended to help planners create effective TDR programs by identifying those features that contribute significantly to success.

Methods: We created a list of the 20 U.S. TDR programs that have preserved the most land to date. We then identified the 10 success factors that publications about TDR have cited most frequently since 1972 and determined how many of the 20 programs actually exhibit these factors.

Results and conclusions: The following 10 success factors are those referenced most often in the literature. Each is followed by the number of top 20 TDR programs that exhibit this factor in parentheses. Demand for bonus development (20), customized receiving areas (20), strict sending-area regulations (18), few alternatives to TDR (17), market incentives (15), certainty of use (14), strong public preservation support (13), simplicity (13), promotion and facilitation (12), and a TDR bank (4). These results suggest that the first two factors are essential to success, the next three are extremely important, and the remaining five factors are helpful but not necessarily critical, although some, such as TDR banks, can produce extraordinary results.

Transfer of development rights (TDR) is intended to reduce or eliminate development potential in places that should be preserved by increasing development potential in places where growth is wanted. Unfortunately, TDR doesn't always work. Although it has preserved over 350,000 acres throughout the United States in its first 40 years, TDR has not yet lived up to the expectations of many in the planning profession.

Even the simplest TDR program involves several parts. The places that a community identifies for preservation through TDR are called *sending sites*. The owners of sending sites can choose to record a perpetual easement on their land in return for a marketable commodity called *transferable development rights* (TDRs). Participating landowners are compensated by selling these TDRs to developers in TDR *receiving areas*, places that are appropriate for growth. Receiving-area zoning allows some development without TDR obligations, but offers additional development potential when developers buy TDRs.

Takeaway for practice: Communities can establish successful TDR programs by designating receiving areas that fit local conditions and offering development bonuses that developers actually want and need. In addition, successful TDR programs appear to require at least one of the following three characteristics: strict sending-area regulations, market incentives, and/or few ways for development to gain bonus density without using TDR. Five other factors are generally not essential to success, but can greatly improve program effectiveness.

Keywords: transferable development rights, TDR, land preservation, sending areas, receiving areas

Research support: None.

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Receiving-area developers are motivated to buy TDRs by the additional revenue they can achieve when they choose to build at the higher densities available through TDR.

To help TDR live up to its promise, many authors have listed program features intended to improve effectiveness. These lists vary in length as well as content and often do not emphasize which factors are merely useful and which are essential to success. Furthermore, some of these lists date back to the mid 1970s, and consequently do not take recent results into account. Finally, many of these lists were formed by examining a handful of TDR programs, often the same programs studied by other authors. In contrast, we do not confine ourselves to attributes found in a small number of selected case studies. Instead, we aim to synthesize the opinions of numerous authors and compare their advice with the actual experiences of a large number of successful programs, to identify all useable success factors and consider how significantly each factor contributes to program effectiveness.

Specifically, we use 20 publications to assemble 10 characteristics most commonly attributed to effective TDR programs. We determine the extent to which these factors appear in the 20 most successful TDR programs in the United States. We find that all successful TDR programs create receiving areas that fit the community and offer development bonuses that developers actually want. Almost all successful programs also limit the amount of development potential achievable on sending sites, minimize the opportunity to circumvent TDR requirements, and allocate TDRs to sending areas at ratios that create adequate compensation for landowners and affordable TDRs for developers. The other five factors cited most often in the literature appear helpful, but not critical to success, although they can greatly improve program effectiveness.

Successful TDR Programs

TDR is frequently used to preserve resources that are not measured in acreage, such as historic landmarks, affordable housing and preferred urban scale. Nevertheless, we use a single unit of measurement to identify the country's most successful TDR programs: land area preserved. We used a database that goes back to 1994, when Pruetz surveyed the 3,500 most populous communities in the United States about whether they had TDR programs (Pruetz, 1997). We have since updated this database by monitoring news outlets and the planning literature for additional programs. This method yielded 191 TDR programs nationwide, from which we identified the 20 programs that have preserved the most acreage. As shown in Table 1, these 20 programs have preserved over 350,000 acres to date. We recognize that this gross acreage approach treats all preserved land as having equal resource value when in fact there are significant differences (e.g., between a hay field and the habitat of an endangered species). In addition, we treat the preservation mechanisms in these 20 programs as though they provide equal levels of protection when, in fact, some prohibit any form of development while others may allow landowners to retain or build single-family residences at a specified, limited density. Despite this, we maintain that acreage preserved offers a uniform and reasonable criterion for identifying a large sample of successful TDR programs.

TDR Success Factors

In a search of the literature, we found 20 publications that list factors thought to be responsible for making TDR programs successful (Bredin, 1998; Costonis, 1974; Coughlin & Keene, 1981; Farmland Information Center, 1997; Field & Conrad, 1975; Glickfeld, 1990; Heeter, 1974; Kaplowitz, Machemer, & Pruetz, 2008; Lane, 1998; Machemer & Kaplowitz, 2002; McConnell, Walls, & Kelly, 2007; Meck, 2002; Merriam, 1978; Nicholas, Jurgensmeyer, & Leebrick, 1998; Pizor, 1986; Roddewig & Inghram, 1987; Stinson, 1996; Strong, 1998; Tripp & Dudek, 1989; Walls & McConnell, 2007).

These 20 publications mentioned 55 individual success factors. We found that 10 factors were cited in five or more articles; we examine these individually below. Remarkably, some of the earliest writings on TDR identified many of the same factors cited by the most recent publications. For example, in his 1974 book *Space Adrift: Landmark Preservation and the Market*, John Costonis (1974) discussed 7 of the 10 factors that appear in our Tables 2 and 3.

Because we confined this article to features cited in five or more publications, our list of 10 excludes many other factors that could also affect program success. For example, 4 of the 20 publications recommended that TDR be used in conjunction with other preservation tools such as purchase of development rights, development requirements and taxation for conservation purposes. While this is good advice, it was identified by only four authors and did not qualify for our top 10 list.

We used zoning codes, prior studies, web site information and interviews with program managers to determine which of these 10 factors exist in each of our 20 leading TDR programs. Tables 2 and 3 record our findings. As detailed below, these decisions were based entirely on objective criteria for success factors 3, 5, 7, and 10. For

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Table 1. The 20 U.S. TDR programs that have preserved the largest acreage.

Program location	Acres preserved as of 2008	Year of adoption	Average acreage preserved per year	Comments
King County, WA	91,500	1998	9,150	
New Jersey Pinelands, NJ	55,905	1981	2,071	
Montgomery County, MD	51,830	1980	1,851	
Palm Beach County, FL	35,000	1993	2,333	
Collier County, FL	31,400	2002	5,233	Rural lands stewardship program only
Calvert County, MD	13,260	1978	442	Program amended 1999 and 2003
Queen Anne's County, MD	11,176	1987	126	Original program amended in 1994 and 2004
Sarasota County, FL	8,200	1982	911	Original program ended 1991; program that replaced original has produced no transfers
Pitkin County, CO	6,452	1994	461	
Boulder County, CO	5,900	1989	311	Acreage estimate as of 2005. 1989 countywide mechanism supplemented by intergovernmental agreements starting in 1995
San Luis Obispo County, CA	5,463	1996	455	Refers to countywide program
Blue Earth County, MN	5,360	1970	214	
Howard County, MD	4,525	1992	283	
Miami/Dade County, FL	4,145	1981	154	Acreage estimate as of 2001
Payette County, ID	4,145	1990	230	Amended in 1998 and 2000
Charles County, MD	4,089	1992	256	
Rice County, MN	3,850	2004	963	
Douglas County, NV	3,728	1996	311	Amended in 1998 and 2001
Collier County, FL	3,450	2004	863	Rural fringe program
Chesterfield Township, NJ	2,272	1998	227	Original program adopted in 1975 and amended in 1985 and 1987

Sources: Interviews with program managers; Calvert County Agricultural Preservation Advisory Board, 2008; Collier County, FL, 2008; King County, WA, 2008; Montgomery County Department of Economic Development—Agricultural Services Division, 2008; New Jersey Pinelands Commission, 2008a; Pruetz, 2003; Walls & McConnell, 2007.

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success factors 1, 2, 4, 6, 8, and 9, our evaluations were partly subjective and included the opinions of the program managers we interviewed. Despite this, we think our assessment should help planners design more effective TDR programs in their communities.

We rank each success factor according to the number of TDR programs that exhibit that characteristic. Table 2 depicts the factors we refer to as essential or important to success, and Table 3 presents those factors which appear to be helpful, but not critical, to success. We discuss each of the factors individually below.

Factor 1: Demand for Bonus Development

For TDR to work, the extra density that developers get when they buy TDRs must be something they actually want. By definition, all 20 top programs exhibit this characteristic because they have all demonstrated enough demand to save a meaningful amount of land.

In contrast, many TDR programs fail because developers are satisfied with the density that they get for free without buying TDRs. When demand is inadequate, some communities consider downzoning the receiving area (rezoning the receiving area to allow less development potential as a matter of right) and requiring developers to buy TDRs to exceed that newly reduced baseline density. Downzoning is politically unpopular and likely to generate threats of lawsuits, particularly if the downzoning appears designed solely to create demand for TDRs. Downzonings are more acceptable when they restrict both sending and receiving sites and when the current zoning in the areas they affect is clearly failing to achieve the community's comprehensive plan. This was the case in Calvert County,

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Table 2. Essential and important factors present in the 20 U.S. TDR programs that have preserved the largest acreage.

	Essential factors		Important factors		
Program location	**Factor 1 Demand for bonus development**	**Factor 2 Customized receiving areas**	**Factor 3 Strict sending-area regulations**	**Factor 4 Few alternatives to TDR**	**Factor 5 Market incentives**
King County, WA	x	x	x		x
New Jersey Pinelands, NJ	x	x	x	x	x
Montgomery County, MD	x	x	x	x	x
Palm Beach County, FL	x	x	x	x	x
Collier County, FL	x	x	x	x	x
Calvert County, MD	x	x	x	x	x
Queen Anne's County, MD	x	x	x	x	x
Sarasota County, FL	x	x	x	x	x
Pitkin County, CO	x	x	x	x	x
Boulder County, CO	x	x	x	x	x
San Luis Obispo County, CA	x	x	x	x	x
Blue Earth County, MN	x	x	x	x	
Howard County, MD	x	x		x	
Miami/Dade County, FL	x	x	x	x	x
Payette County, ID	x	x	x		
Charles County, MD	x	x		x	
Rice County, MN	x	x	x		
Douglas County, NV	x	x	x	x	x
Collier County, FL	x	x	x	x	x
Chesterfield Township, NJ	x	x	x	x	x
Total	20	20	18	17	15

Sources: Interviews with program managers; community plans/codes; Environmental Resources Management, 2005; McConnell, Walls, & Kelly, 2007; Pruetz, 2003; Walls & McConnell, 2007.

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MD, where downzoning is credited with maintaining TDR demand (Walls & McConnell, 2007).

Some communities assume they have little demand for bonus density despite regularly processing applications for upzonings (rezonings that allow greater density). These communities can put that latent demand to work by including a provision in new zoning districts that identifies all dwelling units above the maximum density of the former zoning as bonus units and making these bonus units subject to TDR requirements.

Some communities recognize that their developers might be willing to buy TDRs in order to gain something other than bonus residential density. For example, several of our 20 leading TDR programs allow a specified amount of bonus floor area per TDR. Collier County, FL, requires eight TDRs to develop each acre of receiving area land, and developers in Pitkin County, CO, can use TDRs to get exemptions from building permit quotas.

Factor 2: Receiving Areas Customized to the Community

Of the publications used to identify our success factors, as many as three stress the importance of the following seven receiving area attributes: 1) adequate infrastructure to accommodate the additional development; 2) political acceptability; 3) compatibility with existing development; 4) clear designation; 5) consistency with the comprehensive plan; 6) location where developers perceive a market for higher density; and 7) a receiving area located in another jurisdiction if the sending area is in a community that cannot accept more growth. But notably, six of these publications additionally state that all of these parameters

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Table 3. Helpful factors present in the 20 U.S. TDR programs that have preserved the largest acreage.

Program location	Factor 6 Certainty of TDR use	Factor 7 Strong public preservation support	Factor 8 Simplicity	Factor 9 Promotion and facilitation	Factor 10 TDR bank
King County, WA	x	x	x	x	x
New Jersey Pinelands, NJ	x	x		x	x
Montgomery County, MD		x	x	x	
Palm Beach County, FL	x	x	x		x
Collier County, FL	x	x		x	
Calvert County, MD	x	x	x	x	
Queen Anne's County, MD	x		x		
Sarasota County, FL	x	x			
Pitkin County, CO	x	x	x	x	
Boulder County, CO	x	x	x	x	
San Luis Obispo County, CA					
Blue Earth County, MN			x		
Howard County, MD	x	x		x	
Miami/Dade County, FL	x	x	x		
Payette County, ID			x	x	
Charles County, MD	x				
Rice County, MN			x	x	
Douglas County, NV			x		
Collier County, FL	x	x		x	
Chesterfield Township, NJ	x	x	x	x	x
Total	14	13	13	12	4

Sources: Interviews with program managers; community plans/codes; Environmental Resources Management, 2005; McConnell, Walls, & Kelly, 2007; Pruetz, 2003; Trust for Public Land, 2008; Walls & McConnell, 2007.

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must be carefully tailored to the specific circumstances of the individual community. We suggest that there is no sure-fire template that can be duplicated from one community to another. Instead, the stakeholders must explore all possible receiving area alternatives and select the combination that best fits each unique situation. Since all 20 communities in this article have achieved some degree of success, we conclude that each has found a receiving area scenario that works for them. The following profiles are designed to illustrate the various ways in which some programs customized their receiving areas to serve local needs.

Ideally, TDRs are transferred from rural areas into cities or the urban fringe, where the infrastructure, employment, shopping, and public services needed to accommodate additional development already exist. Of our 20 leading programs, 16 have been able to create receiving sites in areas under their own jurisdiction. In the other four programs, interjurisdictional transfers are permitted, with sending areas typically under county jurisdiction and receiving areas within incorporated cities. For example, Boulder County, CO, has signed intergovernmental agreements in which six cities and three unincorporated communities pledge to accept TDRs from land under county jurisdiction.

In some communities, "not in my back yard" (NIMBY) attitudes and other factors prevent the location of receiving areas within or even near existing development. Some programs have responded with new-town receiving areas that separate new development from existing neighborhoods. The Rural Lands Stewardship Program in Collier County, FL, has already preserved 31,400 acres primarily through the development of one of its new-town receiving sites, which has a planned build-out of 11,000 dwelling units made possible, at least in part, by its relatively isolated location.

In addition to interjurisdictional transfers and new towns, some of our 20 programs have found that low density receiving areas are best for them. For example, Calvert County, MD, offers the TDR option in five zoning

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districts including the rural community district (RCD) zone, where developers can use TDR to achieve the relatively low density of one dwelling unit per four acres. The RCD has attracted most of the Calvert County TDRs and is credited by some for the success of this program (McConnell, Walls, & Kelly, 2007).

Factor 3: Strict Sending-Area Development Regulations

Logically, landowners will be more inclined to choose TDR when the alternative of development in the sending area is less attractive due to steep terrain, remote location, lack of infrastructure, and other constraints. However, the only development constraint identified as a success factor in more than 5 of the 20 articles we reviewed was strict regulation. We judged a TDR program to have strict sending-area regulations if any of the sending-area zoning districts prohibited densities greater than one unit per five acres. The purpose of sending-area zoning, of course, is to implement the community's goals for protecting the area, and one unit per five acres may or may not accomplish this. Thus, it is a threshold not a model. In fact, several of the leading TDR programs we identified use sending-area zoning that is far more restrictive than this.

Only 2 of the 20 leading TDR programs we identified have sending-area zoning that allows development densities greater than one dwelling unit per five acres. Furthermore, these two programs are not among the most successful on our list. This suggests that although it may be possible to achieve limited success without strict sending-area zoning, permissive sending-area zoning will likely create serious problems for a TDR program. For example, permissive zoning produces greater potential development value, which can result in TDRs that are prohibitively expensive. If developers consider TDRs too costly, they will not buy them and the program will falter. A community can encourage lower TDR prices by granting more TDRs per acre of land preserved, but if the TDR allocation is too generous, the result will be a program that generates many transfers but relatively little preservation. A weak regulatory framework can also cause a landowner to question a community's commitment to preservation. For example, farmers could legitimately wonder whether it makes sense to preserve their land if permissive zoning will ultimately allow their farms to be surrounded by subdivisions whose residents may object to agricultural practices, noises, and odors.

Strict zoning predates TDR in some communities, but many have permissive zoning and find it necessary to downzone the sending area when they adopt a TDR ordinance. Most famously, Montgomery County, MD, downzoned its 90,000-acre sending area from a maximum of one unit per 5 acres to one unit per 25 acres. In fact, many communities adopt TDR specifically as a way to mitigate a downzoning. However, such downzoning risks accusations that the new restrictions effectively take private property for a public purpose without compensation, which, if true, would violate the Fifth Amendment to the U.S. Constitution.

A discussion of the components needed to prevail in a takings lawsuit exceeds the scope of this article, particularly since this area of the law is still evolving. In *Suitum v. Tahoe Regional Planning Agency* (1997), the U.S. Supreme Court sent back to the lower courts a case which could have clarified the extent to which TDR could remedy a regulatory taking, but the case was settled before these questions were answered. Communities relying on TDR as their sole defense against the possibility that a particular downzoning constitutes a taking should be aware that this area of the law remains unresolved.

Factor 4: Few or No Alternatives to TDR for Achieving Additional Development

Dozens of the 191 TDR programs in our national database have failed to preserve much or any land because the community offers developers opportunities for additional development without having to comply with TDR requirements. For example, many communities allow bonus density for clustering lots in one portion of a single parcel while preserving the remainder of the property. Other communities offer additional development potential to projects that exceed standards for open space, landscaping, design features and amenities. Given the choice, many developers would rather achieve bonus density using features that enhance the value of their developments rather than preserving another unrelated site. At the furthest extreme are communities that have TDR ordinances on the books, yet do not require TDRs when they approve upzonings. No matter how well intentioned, these exceptions can erode a TDR program's effectiveness, providing developers many examples to justify why they too should be granted an exception.

Most successful programs rarely allow developments to circumvent TDR requirements. In the New Jersey Pinelands program, the State of New Jersey not only required the 60 jurisdictions to conform their codes to implement the regional TDR program, but the Pinelands Commission reviews and certifies all municipal zoning and land use ordinances and master plans for consistency with the Comprehensive Management Plan (New Jersey Pinelands Commission, 2008b).

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Factor 5. Market Incentives: Transfer Ratios and Conversion Factors

Many TDR programs use a one-to-one transfer ratio, meaning that for each dwelling unit precluded at a sending site, one bonus dwelling unit is allowed at a receiving site. At times, this formula can work for both landowners and developers. But it is also likely that the dollar value increase resulting from one additional dwelling unit in a receiving area will not equal the value reduction caused by preserving a relatively large amount of land in the sending area. Many programs aim to allocate enough TDRs so that the amount paid for TDRs equals or exceeds the reduction in land value caused by the sending site easement. This land value reduction is greatly influenced by the severity of the restrictions controlling development of the sending area as well as the landowners' belief that the community will maintain these regulations for the foreseeable future. For example, in Montgomery County, MD, sending-area zoning of one unit per 25 acres controlled the development value of land, resulting in TDRs that sold for the affordable price of roughly $10,000 each (in 2004 dollars) for the program's first 20 years (Walls & McConnell, 2007).

In an effort to create market incentives for sending-area landowners and receiving-area developers, many TDR programs adopt an enhanced transfer ratio, meaning that more than one additional dwelling is allowed in the receiving area for each dwelling unit precluded in the sending area. For example, assume a program with the following parameters: The maximum sending area density is one unit per 25 acres; landowners who preserve a sending site receive one TDR per 5 acres; and each TDR allows a receiving-area developer one bonus dwelling unit. This program would have a five-to-one transfer ratio. Since the ratio is greater than one to one, we refer to it here as an enhanced transfer ratio. To further illustrate why this hypothetical program might offer a five-to-one transfer ratio, assume that a market study has determined that receiving-area developers will be willing to pay $10,000 for each bonus dwelling unit and that sending-area owners would accept $2,000 per acre to preserve their land. The right market incentives should be created by an allocation ratio of one TDR per 5 acres, which, under our assumed sending site zoning of one unit per 25 acres, represents a five-to-one transfer ratio.

To evaluate the importance of market incentives, we identified all programs with enhanced transfer ratios. We also identified all programs in which a TDR produced by reducing residential development potential on a sending site can be converted to an increase in some other development potential, such as floor area, building height or lot coverage, at a receiving site. We found that all but 5 of the 20 programs studied used enhanced transfer ratios, conversion factors or both. Just because enhanced transfer ratios and conversion factors exist does not necessarily ensure that they are optimal. But their existence does indicate that the community understands the importance of making the program attractive to TDR buyers and sellers alike.

Although we separated the five leading success factors for examination, they are interdependent components that work together rather than individually. For example, strong demand for bonus development (factor 1) is most likely to result when receiving areas are customized to fit local circumstances (factor 2), when strict sending area regulations motivate landowner participation (factor 3), when TDR is one of the only ways developments can gain bonus density (factor 4), and when TDRs are allocated to sending areas at ratios that create sufficient compensation for sending-area landowners and affordable TDRs for developers (factor 5). In other words, these factors should be thought of as interrelated components of a coordinated regulatory framework.

Factor 6: Ensuring That Developers Will Be Able to Use TDR

Some TDR programs flounder because developers are not sure they will be granted bonus density when they choose the TDR option. Communities can give developers greater certainty by using receiving-site zoning that eliminates or minimizes discretionary approvals. In these programs, developers know that they will be granted maximum density if they comply with all zoning regulations including the TDR requirements. This certainty often motivates the development community to support the adoption of TDR, since developers dread an approval process that subjects them to delay, reduced density, unanticipated costs, and uncertainty about whether or not their projects will be approved at all.

Factor 7: Strong Public Support for Preservation

Of the 20 leading TDR programs we reviewed, 13 exhibit strong public support for preservation by having at least one of the following: a locally funded purchase of development rights (PDR) program; another conservation funding program approved by county voters since 1988; or a TDR bank, which is a government entity that uses public funds to buy TDRs and hold them for resale to developers. This factor may seem counterintuitive, since TDR is often perceived as a way of funding preservation without taxation. In fact, if we reviewed all 191 TDR programs in our database, we would likely find that many communities do not complement TDR with PDR or any other form of

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locally financed preservation. However, this article deals with the 20 leading TDR programs in the nation and in 65% of these communities the public has demonstrated its commitment to conservation with its own tax dollars.

Without strong public support for preservation, controversies over TDR program components may be settled by political compromise, leading to decisions on sensitive topics like locations of receiving areas and restrictions on sending area development that do not adhere to the best practices we describe here. Furthermore, TDR programs are typically implemented over decades rather than years. During this amount of time, elected officials will change. Consequently, ongoing public support can be important to ensuring that requests for exceptions to TDR requirements do not damage or even destroy a program's effectiveness.

Factor 8: Simplicity

Of the 20 publications we reviewed for this article, 7 cited program simplicity as an important success factor. A program's simplicity helps it build support among the diverse groups that are potential supporters, including landowners, developers, preservationists, homeowner organizations, and the general public, not to mention elected officials. Based on program regulations and interviews with program managers, we judged 12 of the 20 leading TDR programs we studied to be simple, including the highly successful program in Montgomery County, MD. We consider the other eight programs to be relatively complicated, often because some of their objectives are inherently complicated, like making interjurisdictional transfers. Some of these complicated programs have also preserved the greatest amount of land, suggesting that though simplicity can be helpful, it is not essential.

Factor 9: TDR Promotion and Facilitation

For TDR programs to succeed, developers, and landowners have to know the TDR option is available, how it works, and how it can help them. In addition, the general public should be regularly reminded of TDR program benefits, since elected officials are routinely asked to make exceptions to TDR requirements which, if granted, could eventually render a program ineffective. Since TDR programs as well as the affected landowners and developers are constantly changing, a comprehensive, well-maintained webpage is a good indication of outreach to the general public. King County, WA, sets a high standard for promotion with regular press releases about TDR as well as a website with background information and access to codes. The New Jersey Pinelands website illustrates exceptional public outreach through a variety of recreational and educational programs aimed at school-age children as well as adults.

Factor 10: A TDR Bank

A TDR bank is an entity officially authorized by the community to buy, hold and resell TDRs. Eleven of the 20 publications we reviewed discuss how having a TDR bank can enhance a TDR program. The bank can acquire TDRs from sending-area landowners who cannot find private buyers. It can establish and stabilize TDR prices. It can facilitate transactions. It can market the TDR program. It can create an ongoing preservation revolving fund by buying TDRs, selling them, and using the proceeds to buy more TDRs.

Of the 20 programs under study here, only 4 have TDR banks. However, these four programs are among the most successful in the nation, accounting for over 185,000 acres of preserved land, or over half of the land preservation achieved by all of the 20 leading programs combined. Furthermore, in King County, WA, and Palm Beach County, FL, most of the land preservation has been achieved by the acquisitions of their TDR banks.

Despite the success of these four programs, TDR banks should be considered helpful but not critical to program success. For example, Montgomery County, MD, has remained one of the most successful programs in the country without the assistance of a TDR bank. In fact, Montgomery County created a TDR bank in 1982, but because it had all of the other success factors, sellers were always able to find willing buyers in the private market and the bank was terminated in 1990.

Conclusions

The planning literature has correctly identified features associated with successful TDR programs. The presence of two of these features in all 20 of the TDR programs we identified as most successful based on the amount of land they had preserved suggests that these two factors are essential to success: developers must want the additional development only available though TDR (factor 1) and the receiving areas must be customized to work within the physical, political, and market characteristics of the community (factor 2). At least three-quarters of these 20 successful programs also have one or more of three additional factors that appear to be important: They strictly limit development on sending sites (factor 3), they offer developers few alternative ways of gaining additional development potential other than TDR (factor 4), and they offer market incentives, like transfer ratios and conversion factors, designed to produce TDR prices that adequately compensate sending-area landowners, yet are affordable to receiving-area developers (factor 5). Factors 6–10 appear to be helpful, but not critical to success.

The reverse of these success factors could be called the failure factors. When asked why their programs have

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experienced few or no transfers, many TDR managers offered the mirror image of the success factors identified in this article. "Our developers don't want more density." "We don't have good receiving areas." "We give developers easier ways of getting bonus density." "Our sending-area zoning is too generous." "We don't offer landowners enough TDRs to motivate them." Although purely anecdotal, these familiar phrases appear to reaffirm the success factors identified in this article.

The findings in Tables 2 and 3 suggest a hierarchy of success factors that communities should keep in mind when developing TDR programs. Even though we assumed that all 20 of the successful programs we studied possessed factors 1 and 2, we do consider them essential to success. It is a common misconception that a community either possesses or does not possess these attributes, and nothing can be done about this. In fact, there are ways of creating TDR demand and tailoring receiving areas to fit a community. As discussed above, TDR requirements can be incorporated into the upzoning application process that occurs regularly in most communities. Similarly, if political opposition prevents the location of receiving areas within existing cities, communities can consider creating new towns, new villages, or even rural receiving areas.

As shown in Table 2, 6 of our 20 leading programs lack at least one of factors 3, 4, or 5. Nevertheless, we consider these three factors important to success, since 70% of the 20 leading TDR programs possess all three and all of these programs possess at least one of these three factors.

Although this article discusses the five leading success factors individually, these features interact closely with one another. Demand for bonus development (factor 1) is affected by receiving areas that fit local conditions (factor 2), by sending area regulations that motivate landowner participation (factor 3), by provisions that minimize ways to avoid TDR requirements in receiving areas (factor 4), and by market incentives that make TDRs attractive to buyers and sellers alike (factor 5). In other words, these five key factors are interrelated components of a coordinated regulatory framework.

We consider factors 6–10 to be helpful, but not critical to success. In support of this conclusion, one of our 20 leading TDR programs has none of these five helpful factors. However, any one of these factors could make a significant difference in a particular community. For example, developers in one community might oppose a TDR program unless they gain the certainty of being able to obtain bonus density when they use TDR (factor 6). Similarly, a TDR program could lose the support of the general public in some communities without a concerted effort to remind people of the benefits of preservation (factor 9). And although TDR banks (factor 10) are found in relatively few programs, where they exist they can make an extraordinary difference in the amount of land preserved, as seen in King County, WA, and Palm Beach County, FL.

The 10 top programs in acres preserved possess on average more than eight success factors each. The second 10 programs in acres preserved possess on average slightly over six factors each. This suggests that TDR programs with more success factors will generally preserve more land. A close look at Tables 2 and 3 reveals that the top 10 programs exhibit more of the essential and important factors (included in Table 2) and more of the helpful factors (depicted in Table 3) than do the second 10 programs. It is noteworthy that nearly all of the top 10 programs possessed all of factors 1–5. This result suggests that communities should focus on coordination of these five key factors to create a regulatory framework that works for the sending-area landowners and receiving-area developers as well as for the community as a whole.

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