

Perceptions of How the Presence of Greenway Trails Affects the Value of Proximate Properties

John L. Crompton

ABSTRACT: There is a substantial body of literature confirming that natural resource-based parks and open space substantially enhance the value of proximate properties. These findings can appropriately be extrapolated to greenway trails in contexts where they are accompanied by extended tranquil views which account for the increases in proximate property values associated with parks and open space. However, in other cases where the greenway trail consists of a fairly narrow urban corridor, enhanced property value associated with the trail is likely to come from access to the linear trail, rather than from views of open space.

Nine studies were found that addressed the impact of greenway trails on property values. For the most part, the trails were located in relatively narrow corridors. Eight of them used attitude and opinion surveys of homeowners and other stakeholders, rather than changes in actual property values, to reach their conclusions. This surrogate approach is more tenuous than measuring actual changes in property values. Further, only one of the studies was reported in a refereed journal, indicating that the studies may not meet acceptable standards of social science. Nevertheless, they represent the best information currently available on this sometimes controversial issue. In the concluding section of the paper, suggestions are given for designing a research program in this area.

The consistent pattern emerging from the studies which were reviewed, and the diversity of milieus in which they were conducted, enables a reasonable level of confidence to be placed in generalizations drawn from them, even with their limitations. Across the studies there was broad consensus that trails have no negative impact on either the saleability of property (easier or more difficult to sell) or its value. There was a belief among some, typically between 20% and 40% of a sample, that there was a positive impact on saleability and value. However, the dominant prevailing sentiment was that the presence of a trail had a neutral impact on the saleability or value of property.

KEYWORDS: Greenways; trails; property values; parks

AUTHOR: John Crompton is a Distinguished Professor, Department of Recreation, Park and Tourism Sciences, Texas A&M University, College Station, TX.

A greenway is any "linear open space established along either a natural corridor such as a river front, stream valley or ridgeline or overland along a railroad right-of-way converted to recreational use, a canal, a scenic road, or other route" (Little 1991, p.1). It can be as elaborate as a lengthy, paved

hiking-biking-riding route, or as simple, natural and ecologically important as a stretch of stream bank left wild. Greenways are “fingers of green that reach out from and around and through communities all across America” (President’s Commission on Americans Outdoors, 1987, p.142). The President’s Commission recommended that “communities establish Greenways, corridors of private and public recreation lands and waters, to provide people with access to open spaces close to where they live, and to link together the rural and urban spaces in the American landscape” (p. 142).

It is possible to conceptualize greenways whose width at one extreme may be measured in miles, while at the other extreme their width may be measured in single-digit feet. In the former case, the impact of greenways on proximate properties may resemble that of large park or open space areas, and greenway trails (the pathways within a greenway corridor on which human linear use is concentrated) will occupy only a minuscule area of the corridor. In these instances, the proximate property value appreciation attributable to greenways may resemble that of large parks and open space. There is a fairly substantial literature demonstrating that in specified contexts parks and open space areas are likely to enhance the value of proximate properties. A comprehensive review of this literature appears in Crompton (2001).

The enhanced value derives from people’s willingness to pay a larger amount of money for a home located close to these types of areas than they are for a comparable home further away, because of the tranquility, peace, and psychological relaxation such vistas often provide. A consequence of this is that owners of this enhanced property pay higher property taxes to governments because of the increase in the property’s appraised value. In effect, this represents a “capitalization” of open space into increased property values for the proximate land and buildings.

In some instances, if the incremental amount of taxes paid on each property that is attributable to the presence of the park or open space is aggregated, it will be sufficient to pay the annual debt charges required to retire the bonds used to acquire and develop the park. In these circumstances, the park is obtained at no long-term cost to the jurisdiction (Crompton, 1999). The consistent stream of studies reporting this value-enhancing effect of parks dates back to Frederick Law Olmsted’s documentation of the impact of Central Park on surrounding real-estate values in New York (Fox, 1990). Olmsted’s findings were widely publicized and established the positive impact of parks on the tax base as conventional wisdom among planners and park advocates in the latter quarter of the nineteenth century and early decades of the twentieth century. Olmsted’s documentation was used to justify major park investments in many other communities, most notably in Brooklyn, in Boston and in Kansas City (Fox, 1990). The impact of his work was subsequently reinforced by similar findings reported in New Jersey in Newark, Essex County (Weir, 1927) and in Union County (The Playground 1928). In many ways these early studies

were naive, reflecting the underdeveloped nature of the statistical tools and research designs in the early years of the field. However, with the emergence of computing in the late 1960s and 1970s, more sophisticated statistical analyses were undertaken, and the findings generally confirmed those of the earlier studies. A detailed review of this literature included the following among its conclusions:

- The empirical evidence from 20 of 25 studies reviewed supported the premise that parks and open spaces contributed to increasing proximate property values. In four of five studies that did not support the proximate principle, it was suggested that the ambivalent findings may be attributable to methodological limitations.
- Parks embracing primarily active use recreation areas showed much smaller proximate increases than those accommodating only passive use.
- The magnitude of the proximate effect varied according to size, usage and design of parklands, but a positive impact of 20% on property value abutting or fronting a passive park area is a reasonable guideline as a point of departure.
- The proximate impact of parkland and open space is likely to be substantial up to 500 feet, and in the case of community parks is likely to extend out to 2000 feet (Crompton, 2001).

Those instances where the greenway is not a wide swath but rather a narrow corridor of which the greenway trail occupies a substantial portion, are conceptually different from parklands and open space, because they do not provide the extended tranquil views that underlie increases in proximate property values in those contexts. Enhanced property value associated with greenways of this nature is likely to come from access to the linear trail, rather than from views of nature or open space. It is the trail's functionality or activity potential that is likely to confer most added value, in lieu of the panorama of attractive open space. However, it is possible in some densely developed areas that the positive aesthetics associated with even a narrow strip of open space may add value.

The suggestion that access to narrow trails of this nature enhances property values is nearly always controversial when the issue is debated in communities. Much depends on perceptions of who the users of the trails are likely to be. For example, if it is perceived that the trail may facilitate the movement of economically disadvantaged residents through a relatively affluent neighborhood, then the trail may be supported by the former, but resisted by some people in the latter group, who fear a decrease in their property value.

Rather than increasing property values, some argue that in these narrow corridor contexts, greenway trails will cause property values to decline because they encourage a flow of non-local people to pass through neighborhoods. The concern is that this will result in a loss of privacy,

trespass, litter, noise, increased crime and vandalism, and other problems. Thus, Ms. Sharon Sayles Belton, the long-term mayor of Minneapolis, who has been a staunch advocate of trails, observed, "It has been my experience that after a trail has been put in, the residents abutting it seek to curtail its public use" (Sayles Belton, 1999). However, these concerns do not appear to be supported by the limited empirical literature on this issue, which suggests that while there may be negative aspects to living close to greenways, they are not as serious as many landowners anticipated they would be before they were constructed, and that trails are often better neighbors than landowners expect them to be (Moore, et al. 1994). Controversy of this nature and concern about the effect of greenway trails on property values was the stimulus for commissioning most of the studies reviewed in this paper.

The findings reviewed here relate to the perceived impact of greenway trails rather than greenways per se on proximate property values. Although a greenway trail can take multiple forms, the term generally refers to a high-standard paved trail that accommodates multiple uses (Moore & Ross, 1998), and this description generally portrays the character of trails reviewed here. For the most part, the trails were located in relatively narrow corridors.

Only one of the nine papers reviewed here, (Moore, Graefe & Gitelson, 1994), appeared in a refereed journal. The remaining eight are from consultants' reports, agency in-house studies, or student theses. Thus, it is likely that there are limitations in design, sampling, data collection and analytical techniques, which mean the studies may not meet acceptable standards of social science research. Nevertheless, the author believes a review of this material offers three contributions to the greenways literature. First, if some consistent findings emerge across the nine different studies that are reviewed, then they may offer some useful insights to decision-makers in the absence of any other information to guide them. Second, the review draws attention to the embryonic state-of-the-art in this area of research, which may encourage others to develop a research program to address it. Third, these limitations provide a baseline from which to suggest direction for a future research program.

Studies measuring the impact of parks and open space on property values invariably measured shifts in property transaction prices or assessed valuations. However, in the case of greenway trails, research of this nature has not been reported. Instead of examining trends in market transactions or assessments, eight of the nine studies that were reviewed used attitude and opinion surveys of homeowners, residents, developers, and realtors. It was assumed that these attitudes and opinions reflected residents' or homeowners' personal experiences, and the professional expertise of developers and realtors. These survey studies are less definitive and convincing than studies that examine trends in market transactions. Nevertheless, until this latter type of research is undertaken, such survey results represent the

Table 1
Adjacent Residents' Perceptions of Trail Impacts on
Their Property Values (n=410)

Impact of Trail on Property Value	Lafayette-Moraga Trail	Alameda Creek Trail
Increased Value	36%	18%
No Effect	48%	72%
Decreased Value	7%	4%
No Response	9%	6%

best available evidence. At the conclusion of the paper, suggestions are made for development of a research program that more adequately addresses the issue.

Review of Findings

The earliest trail impact study was undertaken in 1978 in the San Francisco Bay area (East Bay Regional Park District, 1978). The owners of 410 residences were surveyed. They were located in areas adjacent to either the Lafayette-Moraga or the Alameda Creek trails. The former was developed from an abandoned rail line while the latter was part of a flood control project. Results are shown in Table 1. Only 7% and 4% of homeowners on the two trails believed their property values had been lowered as a result of the trail's presence.

Almost a decade went by before another trail study was undertaken, this time in Seattle to evaluate the effect of the 12-mile Burke-Gilman Trail on property values and crime in residences near and adjacent to the trail (Seattle Engineering Department, 1987). The trail is 8-10 feet wide, asphalt paved, and follows an abandoned railroad right-of-way. It passes primarily through residential neighborhoods, but also through an industrial area, several neighborhood commercial areas, and the University of Washington. It links six parks, and in 1987 was used by 5,000 people a day, of whom 80% were bicyclists.

The trail was opened in 1979, and it was assumed after eight years' experience with it that stakeholders would have formed fairly clear opinions as to its effect on property. Two groups of stakeholders were surveyed by telephone: residents living adjacent (n = 210), and within one block of the trail (n = 159); and real estate agents (n = 75) who bought and sold homes in neighborhoods near the trail.

Results of the residents' survey are summarized in Table 2. Three groups of residents were surveyed: owners of single-family homes adjacent to the trail; owners of single-family homes within one block of the trail; and owners of condominiums adjacent to the trail. They were asked two questions: (1) If you were to sell your home today, do you think being near the Burke-Gilman Trail would make the home easier to sell, the home more difficult to sell or have no effect on selling the home? and (2) If you were

Table 2
Results of a Survey of Homeowners on the Burke-Gilman Trail

Type of homeowner	Impact on home saleability				Impact on house price			
	Positive	Neutral	Negative	No response	Positive	Neutral	Negative	No response
Single-family home owners adjacent to the trail (n=110)	44%	27%	9%	20%	22%	40%	8%	30%
Single-family home owners within one block of the trail (n=159)	52	24	9	15	30	48	7	16
condominium owners adjacent to the trail (n=100)	52	36	1	11	21	51	2	26

to sell your home today, do you think being near the Burke-Gilman trail would make the home sell for more, make the home sell for less, or have no effect on the selling price of the home? Similar questions were subsequently used by most of the other reported studies reviewed in this paper that addressed this issue.

The data in Table 2 show that relatively few residents perceived the trail to have a negative influence on their property. More of those living a block away from the trail and condominium owners viewed it as a positive influence on their property than did single-family homeowners who were adjacent to the trail. However, the dominant feature of these results is the large proportion who perceived the trail to have either a neutral impact or expressed no opinion. On perceptions of the trail's impact on house prices, approximately two-thirds of respondents were in one of these two neutral categories.

A larger proportion of real estate agents than residents perceived a negative impact on residences adjacent to the trail, but they were still outnumbered by those who saw the trail as having a positive impact on both house price and on home saleability (Table 3). None of the 75 agents surveyed perceived the trail to have a negative impact on properties located within two blocks of the trail but not adjacent to it. Indeed, their consensus view was that these properties sold for an average of 6% more because of the trail.

Not a single resident who was surveyed felt that the trail should be closed, and almost two-thirds of residents believed the trail enhanced the quality of life in the neighborhood. The authors of the report concluded:

In summary, this study indicates that concerns about decreased property values, increased crime, and a lower quality of life due to the construction of multi-use trails are unfounded. In fact, the opposite is true. The study indicates that multi-use trails are an amenity that helps sell homes, increases property values and improves the quality of life (p. 3).

Table 4 shows results of a survey conducted by phone that reported adjacent residents' attitudes to the Root River and the Luce Line trails in 1988 in Minnesota (Mazour, 1988). Both these trails were converted from abandoned railroad rights-of-way. The sample was relatively small ($n = 74$), but only 11% of the sample believed the trails lowered their property values. The survey also reported that landowner concerns prior to trail development were greater than the subsequent problems that they actually experienced.

In 1992, the National Park Service commissioned a study of the impacts of three trails that were formed from rail right-of-ways (Moore, Graefe, Gitelson & Porter, 1992). They were (1) the 26-mile Heritage Trail in Iowa from Dubuque to Dyersville which was rural; (2) the Tallahassee to St. Marks Historic Railroad State Trail in Florida, which runs for 16 miles through a mix of settings, primarily rural but including the town of Woodville and several areas of single family home development; and (3) the

Table 3
Real Estate Agents' Views of the Impact of the Burke-Gilman Trail on Residential Property (n=75)

Type of homeowner	Impact on home saleability			Impact on house price		
	Positive	Neutral	Negative	Positive	Neutral	Negative
Adjacent to the trail	43%	26%	31%	33%	42%	25%
Within two blocks of the trail	75	25	0	43	57	0

seven mile Lafayette-Moraga Trail, which was featured in the earlier 1978 East Bay study (Table 1), and passes through heavily developed, relatively affluent suburban areas.

Table 4
Adjacent Residents' Perceptions of the Impacts of Two Trails on
Their Property Values (n=74)

Impact of trail on property value	Root River Trail	Luce Line Trail
Increased Value	14%	58%
No Effect	62%	32%
Decreased Value	14%	9%
No Response	10%	1%

Similarly sized samples were drawn of property owners who lived adjacent to each trail and those who resided within a quarter of a mile but not adjacent to it. Response rates to the eight-page self-administered mail questionnaire ranged from a high of 75% on the Heritage Trail to a low of 58% on the St. Marks Trail for an overall response rate of 66%. In addition, telephone interviews with 25 realtors and appraisers were undertaken in two of the three trail areas, while 17 were interviewed in the less-developed Heritage Trail area.

The property owners' responses shown in Table 5 indicate that there was relatively little difference in the trails' perceived impacts on property values between those living adjacent and those residing nearby. At the generally rural Heritage and St. Marks trails, between 73% and 90% of respondents reported that the trails had no impact on their property values. Along the suburban Lafayette/Moraga Trail, a much larger proportion perceived there to be an effect, and most thought it was positive. Overall, only 7% of adjacent homeowners and 2% of nearby Lafayette/Moraga residents thought the trails lowered the value of their property.

Overall, realtors and appraisers believed the trails would have little effect on property values (increases or decreases in value) or saleability (home sells faster or slower). Again, there was more perception of impact on the suburban Lafayette/Moraga Trail and, in contrast to property owners, a greater proportion felt it was negative than believed it was positive (Table 6). Buyers' concern about possible loss of privacy was given most frequently as the reason for the effect.

The Brush Creek Trail in Santa Rosa, California, is a 1.25-mile, 10-foot-wide asphalt hike and bike trail. It had been operating for nine years when 75 of the 85 homeowners whose properties were adjacent to it were interviewed in their homes in 1992 (Murphy, 1992). The dominant response to the saleability and value questions was "no effect" (49% and

Table 5
Adjacent and Nearby Owners' Opinions About How the Presence of a Trail Affects the Resale Value of their Property

	Heritage	St. Marks		Lafayette/Moraga		Combined		
	adjacent (n=51)	nearby (n=49)	adjacent (n=107)	nearby (n=92)	adjacent (n=142)	nearby (n=142)	adjacent (n=330)	nearby (n=283)
Lower Value	14%	2%	11%	2%	3%	1%	7%	2%
Increased Value	14	8	16	21	53	47	35	31
No Effect	73	90	74	77	44	52	58	67

Table 6
Realtors' Perceptions About the Effect of Three Trails on the Property

Types of impact	Heritage (n=17)			St. Marks (n=25)			Lafayette/Moraga (n=25)		
	Positive	Neutral	Negative	Positive	Neutral	Negative	Positive	Neutral	Negative
Impact on sale-ability of homes adjacent to the trail	6%	94%	0%	20%	80%	0%	20%	48%	32%
Impact on sale-ability of homes nearby	12	88	0	24	76	0	56	44	0
Impact on resale value of homes adjacent to the trail	12	82	6	20	80	0	24	52	24
Impact on resale value of homes nearby	12	88	0	20	80	0	48	52	0

69%, respectively), while 29% and 20%, respectively, reported a “slight” positive effect. Only 17% of the sample perceived the trail to have a negative impact on saleability and 8% on value.

In 1994, the Maryland Greenways Commission funded an analysis of the impact of the Northern Central Rail Trail (PKF Consulting, 1994). Surveys distributed to property owners and trail users, yielded returns of 465 (26.7% response rate) and 199 (16.2% response rate), respectively. Out of this total of 664 respondents, 545 responded to a question asking how much value the trail added to property within walking distance of it. The authors noted that some properties were negatively influenced at peak times when parking areas became full and users parked on nearby private properties. This may have contributed to 7% of respondents believing the trail lowered nearby property values, and a further 30% believing it had no impact on values.

The 63% (n = 341) who felt it had a positive effect, “guesstimated” that it added on average \$2,459 to the value of a typical residence. However, this guesstimate could not be confirmed in an analysis of actual market transactions in the area, possibly because insufficient property exchanges had occurred in the vicinity of the trail since it had been developed for an identifiable pattern to emerge. As was the case in many of the previous studies discussed in this paper, respondents believed that properties within 1,000 feet of the trail, but not abutting it, generally experienced the greatest positive impacts on value.

When the property owner respondents (n = 442) were asked if they believed their house’s proximity to the trail would be a positive selling point, 68% answered affirmatively. This belief was endorsed by developers and brokers who were also interviewed as part of the study. They perceived the trail’s main benefit to be increased saleability of listings. One appraiser noted how frequently brokers advertised the proximity of a property listing to the trail and commented, “they wouldn’t advertise the proximity of the trail if it didn’t help sell property.”

Three trails in the metro-Denver area were selected to study the impact of urban trails on adjacent and nearby property values in a 1994 study sponsored by the Conservation Fund and The Colorado State Trails Program (Alexander, 1995). They were: (1) a 1.5-mile section of the Highline Canal Trail, which is paved and is the most highly used trail in metro-Denver; (2) the Weir Gulch Trail, which is a small paved footpath that has evolved into a connector path between neighborhood parks; and (3) a section of the asphalt Willow Creek Trail, which connects community parks and open space and is also used primarily by neighborhood residents. Since all the trails were more than ten years old, it was assumed that whatever effect they had on property values would have occurred.

Following the precedent of several of the previous studies, data were collected by telephone surveys from: (1) 26 residents who owned or rented property adjacent to the trail; (2) 143 residents within one block of the trail; and (3) 11 real estate agents who did business in metro-Denver. The results

are summarized in Table 7. The overall pattern of the data clearly indicate that an insignificant number of respondents perceived the trails to have a negative impact on the saleability or selling price of the property. The results from the residents adjacent to a trail and the realtors' sample should be considered tentative because of the very small sample sizes, which means that changes in a very few cases cause the percentages to change dramatically. However, the general pattern among both homeowner groups was to favor a neutral impact, while realtors favored a positive impact.

A mail survey undertaken in 1995 of 145 households located in close proximity to three greenways in Cary, which is a rapidly growing city in the Research Triangle region of North Carolina, yielded responses from 109 (75%) of them (Tedder, 1995). The lengths of the three greenways were 0.8 mile, 2.5 miles, and 0.79 miles. The surveyed residences typically were single-family homes, and residents in one of the three areas had vociferously opposed development of the greenway. Although respondents reported that the public use of greenways caused some problems for adjacent residents in the form of trespassing, noise, roaming pets, and loss of privacy, the occurrence of these problems was generally not perceived to negatively impact property values, since 55% believed that the greenways enhanced the resale value of their property. Only 3% reported decreases as a result of the greenway near their home, while the remaining 42% perceived the greenway to have no effect on their property value.

In 1997, the Green Bay-Brown County Planning Commission (1997) in Wisconsin investigated the impact of Brown County's Mountain-Bay Trail on property values. The study focused on the Highridge Estates subdivision in the Village of Howard. The initial phase of the subdivision was developed, and a new addition was currently under development. The study is particularly significant because, unlike all previous studies, it used actual property values rather than residents' perceptions. A comparison of the lots within the original Highridge Estates subdivision indicated that those lots located immediately adjacent to the trail sold for an average of \$34,200, while the remaining lots (of similar size and character) sold for an average of \$31,400, a difference of \$2,800 or nine percent. In addition to selling for more, the lots along the trail also sold faster. According to representatives of the realty companies involved in the development, the lots adjacent to the trail sold immediately, while the lots further away did not sell as fast.

Recognizing what had happened, the realty companies decided to restructure the pricing of future lots located along the Mountain-Bay Trail. Thus, in the addition of Highridge Estates, the average lot located along the trail was priced at \$44,900, compared to \$35,700 for slightly larger lots not located along the trail, a difference of \$9,200, or 26 percent.

Discussion

Although the sample sizes in many of these studies were small, the consistent pattern emerging from them and the diversity of milieus in which they were conducted, enables a reasonable level of confidence to be placed

Table 7
Residents' and Realtors' Perceptions of the Impact of Three Denver Trails on Residential Property

Types of homeowner	Impact on home saleability				Impact on home price			
	Positive	Neutral	Negative	No Response	Positive	Neutral	Negative	No Response
Properties adjacent to a trail (n=26)	46%	38%	8%	8%	35%	46%	4%	15%
Properties within a block of the trail (n=143)	33	50	5	12	33	50	5	12
Realtors (n=11)								
-Adjacent to the trail	73	18	9	0	55	36	0	9
-Within 1 block of the trail	64	36	0	0	9	91	0	0

in generalizations drawn from them. Across the studies there was broad consensus that trails have no negative impact on either the saleability of property (easier or more difficult to sell) or its value. There was a belief among some, typically between 20% and 40% of a sample, that there was a positive impact on saleability and value. However, the dominant prevailing sentiment was that the presence of a trail had no impact on these issues.

The nature of responses to greenway trails is likely to vary according to individuals' value systems and trail contexts. This was noted by a reviewer of this paper who observed: "Even narrow greenway corridors in densely developed areas may offer significant open space and aesthetic value to some owners. The natural habitat and associated wildlife in a narrow wetland in a greenway corridor, for example, is certainly more of an amenity to some buyers than living adjacent to a large golf course."

Some potential buyers of a property may have no interest in hike / bike trails or linear recreation activities, so for them there is no positive counterbalance for the potential negative impacts of privacy loss, people flow and noise. For other potential buyers, especially perhaps those with young children, hiking, biking, and linear recreation activities may be a central feature of their lifestyle, so access to trails far outweighs the perceived potential negative outcomes. These dichotomous lifestyles suggest why some are likely to respond positively to trails, while others remain more circumspect.

This suggests that the challenge for managers is to design trails to alleviate concerns about loss of privacy. The issue was encapsulated in the following statement from one of the studies reviewed:

A home with a trail running very close behind it with no fencing or screening could be affected adversely, while an identical home with private trail access across a well-screened yard might be much more desirable as a result. Several professionals discussed the impact of the trails as a "mixed bag," where the benefits of convenient trail access and living near undeveloped open space had to be weighed against some loss of privacy for adjacent properties. They felt the relative importance of these positive and negative impacts depended on the situation of each particular property and the feelings of each potential buyer (Moore et al., 1992, p. III-15).

Greenway trails take multiple forms (Moore & Ross, 1998, Shafer, Scott & Mixen, 2000) and there is a need to better understand what aspects of a greenway cause impacts on property values. Although it is likely that both design and use characteristics have a substantial differential effect on property values, there has been no empirical verification of this in the existing greenways literature. However, several studies in the parks and open space literature have reported on the impact of different characteristics (Coughlin & Kawashima, 1973; Hendon, Kitchen & Pringle, 1967; More, Stevens & Allen, 1982; Sainsbury, 1964; Weicher & Zerbst, 1973).

Cumulatively, the empirical findings from these park and open space studies suggest that properties facing or directly abutting parks which

primarily serve active recreation users are likely at best to show only a small positive value increment attributable to a park. This reflects the noise, nuisance and congestion emanating from the ingress and egress of traffic and people. However, values are likely to rise substantially, and negative effects are unlikely to be present, on properties located beyond the first block adjacent to the park. In contrast, the value of properties close to parks offering users a passive experience generally follow a classic distance decay curve with those closest to the park exhibiting the highest increments of value.

There is some evidence in these park and open space studies that parks in which there is anti-social behavior may create a negative impact on properties facing or abutting them. The probability of this type of behavior increases if parks are not easily visible from nearby streets. Again, however, any negative impact is likely to dissipate beyond the first block. It seems reasonable to hypothesize that these findings may be replicated in the context of greenways, but as yet there is no empirical verification of this.

Directions for Future Research

The empirical literature on the impact of greenway trails on property values is primitive. The limited research efforts that have been reported are primarily confined to the fugitive (i.e., non-published) literature and have been done by professionals in the field, commissioned from consultants, or by students. With one exception (Moore et al., 1994), this issue has received no attention from the scientific community. Reasons for this are unclear. It may partially reflect the lack of interest and investment in greenway trails before the 1990s. However, the availability of substantial federal funding from ISTEA and TEA21, which facilitated the recent exponential expansion of greenways has not been accompanied by enhanced research interest, even though impact on property values is invariably a primary issue in debates over greenway trails.

This review confirmed that, up to this point, impact on property values has been gauged from surveys of the attitudes and opinions of homeowners and realtors toward the price and saleability of homes located adjacent or close to greenway trails. These data are weak surrogates offering only general impressions whose accuracy cannot be verified, rather than the quantifiable dollar impacts that are needed to enlighten the debate. Models for a research program in this area are available by reviewing the analogous body of literature relating to the impact of parks and open space on property value. The research designs in that literature typically have taken one of three forms.

First, in cases where a greenway trail has been retrofitted through an area, property transaction prices or assessments (available at the assessor's office) before and after the greenway trail was established could be compared to see if there were any differences. A limitation of this longitudinal approach is that there may be insufficient market transactions in the short term (say four year period) to offer a meaningful sample, while over

a longer term, the potential increases may be attributable to unrelated variables that may influence property values and intervene to distort the data.

A second approach is to identify a control area similar in essential respects to a neighborhood abutting a greenway trail but without the trail, and compare the differences in values of comparable properties in the two areas. The challenge with this design lies in accomplishing the match. It requires not only matching housing stock and residents' socio-demographic profiles, but also that all potential factors influencing property values other than the greenway trail in both areas are similar or controllable.

A third design, which has been widely adopted in the park and open space literature, (Crompton, 2001) is a distance decay approach. Typically, property transaction prices or assessed valuations are regressed against a measure of distance and a set of control variables that measure the contributions of other potential influences on property values as well as the greenway trail. The other influences may include such variables as lot size, number of rooms, age, condition and presence of a garage at each house; and location relative to other amenities such as schools, shopping centers, and the central business district.

Initiation of a research program in the scientific community using these types of designs is likely to generate meaningful information on this issue, which is currently lacking. Specifically, the following questions should be addressed:

1. Do greenway trails contribute to increasing property values when other potential influences on those values are also taken into account?
2. How large is the proximate effect?
3. Over what distance does the effect extend?

In recent years, there have been quantum advances in the techniques available for the analysis of spatial data and its marriage to the practice of econometrics (Anselin & Hudak, 1992). The use of geographical information systems appears to have considerable potential for addressing the issues of concern in this paper and as its practice becomes more widespread it seems reasonable to anticipate that efforts using this approach to empirically address these issues will emerge.

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