Ann Reg Sci (2013) 51:355–375
DOI 10.1007/s00168-012-0543-z

ORIGINAL PAPER

Understanding the impact of trails on residential property values in the presence of spatial dependence

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Received: 12 December 2011 / Accepted: 27 September 2012 / Published online: 23 October 2012

Abstract This paper examines the impacts of a multi-purpose trail on residential property values in a hedonic model. Using a large housing data set in combination with street network distances, we show that proximity to trail entrances positively effects property values. Among other things, our study compares the hedonic model results from three different spatial specifications. We pay specific attention to the direct and indirect effects on residential property prices associated with potential changes in house characteristics. In addition, our study predicts property values around trail entrances using a 'modified spatial predictive process' approach that is well suited for capturing spatial dependence in large data sets.

JEL Classification C11 · C21 · R21

1 Introduction

It is well documented in the relevant literature that open spaces, such as parks, urban forests, greenbelts, and multi-purpose trails, make communities more livable, provide opportunities to improve people's physical and mental health, and can boost local economies through tourism (Lindsey et al. 2004). For the "New Urbanist," multi-purpose trails provide the potential for bicycle commuting; help alleviate noise, pollution, and congestion, and, of course, expand the means for green transportation and a

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community's walkability. From a real estate perspective, trails, like many other amenities, can have significant spillover effects on residential property values when these properties are located within reasonable distances to the trails. But while an increasing number of studies in recent years explored the impacts of amenities onto residential property values, only very few studies are specifically devoted to trails.

Developed by Lancaster (1966) and Rosen (1974), the hedonic pricing model is the standard approach used to estimate the marginal implicit prices of individually selected housing characteristics. Housing price, based on people's willingness to pay for these intrinsic characteristics, is modeled as a function of a set of utility-bearing intrinsic properties that constitute it. However, the fact that home-buying decisions are not solely based on structural features of the real estate (e.g., square footage, number of bedrooms), but are also influenced by community (e.g., school district), neighborhood (e.g., median household income), environmental (e.g., traffic noise, air pollution), and locational (e.g., access to public transportation, distance to CBD, public parks) attributes, led to the development of a vast body of the literature over time to account for this array of additional factors that influence house prices.

In addition to accounting for the contribution of non-structure related factors, this paper specifically focuses on the impact of the multi-purpose Little Miami Scenic Trail on neighboring house prices. Even though the literature is somewhat inconclusive about the impacts of trails on house prices (Mogush et al. 2005), we find that the Little Miami Scenic Trail does have a positive impact on residential property values within close proximity, when using street network distances. We prefer street network distances between the residential properties and the closest trail entrance over the often used straight-line distances because potential bicyclists and pedestrians are most likely to travel along the street network to access the trail via the closest trail entrance. In addition to the standard parameter estimation process, we use our hedonic model results to predict the market values for all residential properties around these trail entrances.

While numerous studies do account for spatial dependence between locations when estimating the hedonic model parameters and when using these results to predicting real estate prices (Gelfand et al. 2004; Valente et al. 2005), many results presented in the relevant literature are somewhat restrictive as they have been derived using small data samples. Even though the use of a sparse spatial weight matrix tremendously decreases the computational complexity of spatial econometric models (see LeSage and Pace 2009), many studies nevertheless give preference to explicitly modeling the decay in spatial correlations between locations through use of various functional forms (see Cressie 1993). Until recently, these processes were rather restrictive in that they were applicable only to relatively small data sets. To overcome the data-limiting factor, we apply the "modified" spatial predictive process as proposed by Banerjee et al. (2008) and as extended by Finley et al. (2009). Reducing the number of observations to a significantly smaller number of representative locations, we can overcome the computational challenge of our large data set during the estimation procedure. Through interpolation techniques, estimated parameters can be predicted from the representative smaller sample back to our large data set. After the parameter estimation, we apply the same predictive process to create a contour map consisting of predicted house prices around the trail entrances. To assess the quality of this

estimation procedure, we will compare them with the results from more traditional specifications in the spatial econometric literature.

The outline of the paper is as follows. In Sect. 2, we discuss the relevant and still sparse literature on trails and greenbelts and their impacts on house prices within the hedonic framework. Section 3 presents the study area and the data set and Sect. 4 discusses in greater detail the Spatial Process as well as other widely used alternative methods for handling hedonic pricing models with georeferenced data sets. In Sect. 5, we discuss and compare all model results from our four empirical hedonic specifications. Finally, in Sect. 6, we present the contour map of predicted property values around the trail entrances.

2 Review of relevant literature on open spaces, trails, and greenbelts

There is a long list of factors that potential home buyers take into consideration when looking for a desirable location to buy a house. The quality of the school district (Brasington 1999; Clapp et al. 2008), the availability of public transport infrastructure (Hess and Almeida 2007), and desirable neighborhood characteristics (Lynch and Rasmussen 2001) have received much attention lately in the relevant literature. In addition, proximity to open spaces, scenic resources, and recreational amenities, for example, parks, golf courses, rivers, lakes, and trails, may influence residential property values. Assuming that potential home buyers are willing to pay a premium for residential properties that are in close proximity to a park or a multi-purpose trail, their intrinsic values are included in property prices and can be estimated.

There is consensus in the relevant literature that parks and open spaces have significant effects on residential property prices as they provide improved access to recreational and fitness activities, protect ecosystems, wildlife, and watersheds, or enhance the esthetic environment of a neighborhood. In addition, parks and open spaces can provide the means to improve distressed housing markets, thereby generating additional property tax revenues, and therefore, park and trail developments are viable investment strategies for improving the quality of life in cities in general. The fact that the effects of open spaces on residential property values vary widely by type, usage, size, and distance opens the gateway to a large body of the literature. Of further importance is that the effects of open spaces co-vary with neighborhood characteristics such as population density, income, and crime (Anderson and West 2006).

However, very few studies attempt to assess the relationship between trails and residential property values within the hedonic price framework. In a recent study, Asabere and Huffman (2009) find that the impacts on home values resulting from trails, greenbelts, and trails with greenbelts are 2, 4, and 5 % respectively. Using a semi-logarithmic functional form in a non-spatial hedonic framework and qualitative predictors for the presence of trails and greenbelts, the authors show that house prices increase the most when greenbelts are used to buffer trails. Krizek (2006) argues that different types of bicycle facilities have different amenity values. Accordingly, the author explicitly distinguishes between three different types of bike trails: on-street bicycle lane, off-street bicycle trail (multi-purpose paths including rail trails), and roadside bicycle trail and between the city and its suburbs. Krizek's hedonic

model does also not account for any spatial dependence, but does include distance measures for each home to the nearest trails. He concludes that suburban residents do not value bicycle facilities as a favorable amenity in Minneapolis-St. Paul, while off-street bicycle trails appreciates home values in the city. However, city homeowners regard roadside bicycle trails as a nuisance, thus having a negative impact on house prices. Mogush et al. (2005) explain this rather unexpected finding with the quantity and speed of the adjacent road traffic.

Lindsey et al. (2004) in a semi-log, non-spatial hedonic model use a straight-line approach to identify properties that fall within a mile buffer zone around the trails included in their study. Supported by survey data, the authors argue that trail users beyond 1/2 mile Euclidean distance from the trail are more prone to drive to the trail. Of particular interest for our study are the results for the Monon Trail, which, like the Little Miami Scenic Trail, is a heavily used converted rail-trail that runs from the center of the city north into the neighboring county. For properties located within 1/2 mile of the Monon Trail in Indianapolis, Lindsey et al. show that using mean values for all variables, a total of 14 % ($13,056) of a predicted sales price of $93,283 is attributable directly to the Monon Trail. Altogether, this translates into a combined premium of $115.7 million in property values for the homes within one-half mile of the Monon Trail.

A study by Nicholls and Crompton (2005) is of relevance as it compares different proximity measures. Using a linear, non-spatial hedonic approach, physical proximity between properties and the greenbelts was established using street network distances and buffer zones based on street network distances. Though the results are not conclusive in that similar trends emerged for all three study areas, one can conclude that using network distances is superior to just using buffer zones. For instance, using network distances, Nichols and Crompton show that house prices fall by $3.97 for every foot one moves away from the trail; the regression results become inconclusive when using buffer zones in that the results change widely with the established distance measures (i.e., $0 - 1/4$ mile, $1/4 - 1/2$ mile, $1/2 - 3/4$, and $3/4 - 1$ mile buffer zones).

Our study will significantly add to the literature on trails and greenbelts in that it is the first study that explicitly accounts for the phenomena of spatial dependence in house prices. Further, it discusses three different spatial modeling techniques and presents the corresponding results. Last, we contribute to the existing literature by estimating the aggregate economic benefit of the trail and by predicting potential values of residential properties around the trail entrances and presenting them in a contour map.

3 Study area, data sample, and research design

Our study area is the Little Miami Scenic Trail, a shared multi-purpose trail with equal rights for hikers, runners, skaters, bikers, and equestrians. Though the entire trail extends about 78 miles from the Little Miami Golf Center in Newton, Hamilton County, to Springfield, Clark County, our study focuses on the 12 miles most southern stretch, which lies in Hamilton County, the core county of the City of Cincinnati (Fig. 1).

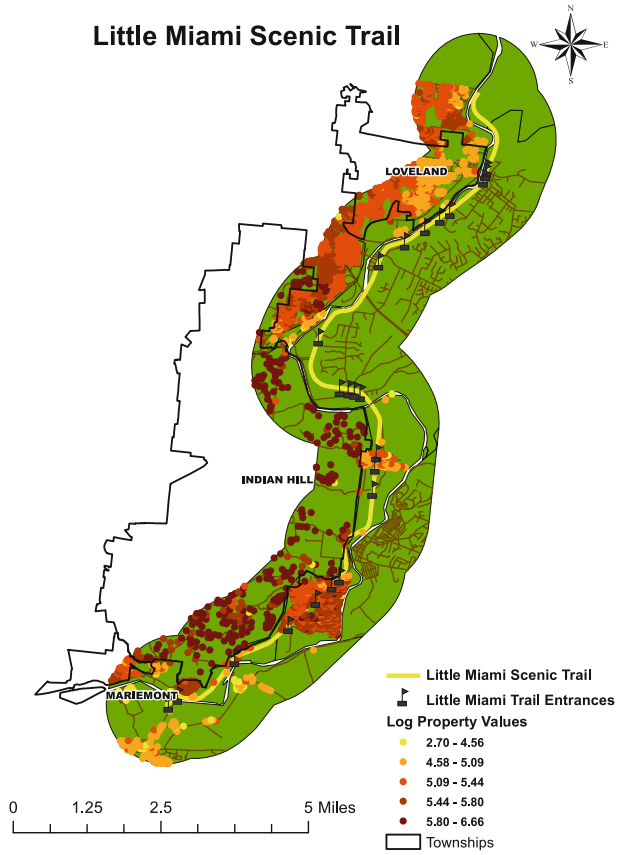

Fig. 1 Observed housing prices

The section of the Little Miami Scenic Trail under study contains a total of 23 trailheads where recreational users can enter the trail. The Little Miami Scenic Trail is considered to be one of the main recreational facilities within the Cincinnati Metropolitan region, as a survey by the Friends of The Little Miami State Park, Inc., a non-profit organization with focus on updating and beautifying the trail, indicates. In just 2 days in July and August of 2010, a total of 4,979 users were counted on the trail at Loveland and 2,374 users at Milford.[1] The popularity of the trail suggests that in accordance with the hedonic price theory, its amenity value may be reflected in the form of a marginal price—the willingness of homeowners in close proximity of the trail to pay a premium for being close to the trail. The hedonic pricing technique (Lancaster 1966; Rosen 1974) is therefore the preferred method to estimate the marginal implicit (i.e., hedonic) prices of individually selected housing characteristics. Based on the notion

[1] 'Friends' help out scenic Little Miami trail: Loveland—For supporters of the Little Miami Scenic Trail, their charge borders on a sacred trust, Cincinnati Enquirer August 21 2010. The 2 days of count were Wednesday, July 28 and Sunday, August 8 2010.

that utility can be derived from commodities' intrinsic characteristics, the proposed framework allows us to explicitly estimate people's willingness to pay for these individual housing characteristics, including the proximity to the Little Miami Scenic Trail. Our data sample contains data for 1,762 single-family residential properties for the year 2005. The housing data were obtained from the Hamilton County Auditor's website and include (actual) sales prices as well as market values and structural characteristics of the properties, such as size (SQFT), age (AGE), and number of bedrooms/bathrooms.

There is a crucial debate about whether to use assessed property values or sales data to reflect actual market values. The State of Ohio requires the assessed value to be calculate every 6 years. Using sales data over a 6-year period preceding the year 2005 would result in a loss of more than half of the observations. The estimation results reveal similar economic interpretation.[2] Cotteleer and van Kooten (2012) give a detailed explanation of the pros and cons of using either sales or assessed values. For instance, assessments might rely on historical appraisals, and therefore might not truly reflect market value. On the other side, distorted sales prices and sample selection might be a problem when using sales data. In fact, we observe that properties sold over the previous 6 years are on average located 300 feet further away from the trail. The main advantage of using assessed values relies on the availability of the data. Working with larger samples has an impact on the estimation of the spatial process. As explained in Cotteleer and van Kooten (2012), the discussion between which of these two proxies, assessed or actual values, is closest to the true property value is still open. Even if sales values are employed more often in hedonic pricing models, many studies support the idea that assessed value is good proxy of market value (Berry and Bednarz 1975; Nicholls and Crompton 2007). In addition, Ventolo and Williams (1994) argue that the market value is the highest price that a property is to sell for in an open market, within a reasonable time frame. In other words, the true market value should come close to actual sales prices for all arm's length transactions and is generally representative of the sales price.[3]

For the purpose of this study, the use of assessed values is more appropriate because a larger sample size of $n = 1{,}762$ allows the construction of a weight matrix that includes a total of 10 neighbors for each property and, as such, goes beyond the more simplistic approach of only including the nearest neighbor in the weight matrix. Further, a larger sample size is essential for a precise prediction of all housing values in the study region (see Sect. 6).

The housing data were supplemented with data from the Ohio Department of Education, the Ohio Department of Transportation, and the Cincinnati Area Geographic Information System (CAGIS). Guided by the principle of parsimony, only statistically significant explanatory variables have been retained within the four developed hedonic pricing models. This is done to isolate the most important explanatory variables making it easier to describe the processes under study. The twelve most rel-

[2] Estimation results available on requests.

[3] Not to be confused with the assessed value used for property tax calculations which, in Ohio, is simply defined as 35 % of the true market value.

Table 1 Data sources and definition

Variable	Description
PRICE	Market value of land and improvements in 2005 (Hamilton County Auditor)
TRAILD	Network distance between each property and the nearest trail entrance in feet (calculated using ArcView)
INC	Median household income by Census block group (Census Bureau, 2005)
SQFT	Finished square footage of the house (Hamilton County Auditor)
AGE	Age of the house in years (Hamilton County Auditor)
LOTSIZE	Lot size of the property in square feet (Hamilton County Auditor)
BASEMENT	Dummy variable denoting a full basement (Hamilton County Auditor)
BRICK	Dummy variable denoting exterior brick walls (Hamilton County Auditor)
FIRE	Dummy variable denoting at least one fireplace (Hamilton County Auditor)
MATH	State of Ohio 9th grade math section proficiency test percentage passage rate for the 2005 school year (Ohio Department of Education)
TAXR	Gross tax rate by school district for the 2000 tax year (Ohio Department of Taxation)
NONRES	Percent of 2000 total property value by school district that is classified as: mineral, industrial, commercial, and railroad (Ohio department of Taxation)
CBDDIST	Shortest distance to Downtown Cincinnati (calculated using ArcView)

Table 2 Data—summary statistics

Variable	Mean	SD	Min	Max
PRICE	263,517.82	280,043.12	25,500.00	3,448,600.00
TRAILD	5,772.39	2,560.28	137.62	9,882.53
INC	83,602.96	34,525.03	35,417.00	191,974.00
SQFT	2,202.91	1,177.90	525.00	13,235.00
AGE	40.43	26.02	2.00	174.00
LOTSIZE	4,185.01	13,776.71	687.00	440,067.00
BASEMENT	0.432	0.495	0.00	1.00
BRICK	0.15	0.36	0.00	1.00
FIRE	0.72	0.45	0.00	1.00
MATH	90.91	4.17	87.10	98.30
TAXR	70.58	12.36	47.10	85.15
NONRES	14.98	10.30	6.62	39.55
CBDDIST	22.34	4.82	12.81	29.02

evant variables explaining the variation in house prices that remained in our analysis are presented in Table 1 along with some descriptive statistics in Table 2.

The average house in our study area is about 40 years old, has on average 2,203 square feet of living space, and is built on a lot of 4,185 square feet (0.096 acres). About 15 % of the properties are built of bricks, 43 % have a full basement, and 72 % have a fireplace. With respect to the 2000 gross tax rate by school district, the mean value was 71 mills, with a minimum of 47 mills and a maximum of 85 mills. Local school achievements have been accounted for by the 9th grade math section proficiency passage rate for the 2005 school year, which has a mean of 91 %, compared to 84.5 %

statewide. Another important component of our regression models is the percentage of property value in 2000 that is classified as mineral, industrial, commercial, and railroad real estate. These non-residential properties make up on average 15 percent of all property values by school district in our sample data. Further, the average household income by Census block group is $86,603. Using the CAGIS data in conjunction with the housing data from the Hamilton County Auditor, two distance variables were generated within ArcInfo 9.3 (ESRI). First, the distances between all single-family residential properties and their nearest trailhead was calculated. A reasonable cut-off point of 10,000 feet was used (i.e., 1.89 miles), which gave us a total of 1,762 residential properties. The choice of network distances over buffer zones or straight-line distances was made to account for the fact that trail users are most likely to follow the street network to the nearest trail entrance. Network distances were calculated within ArcInfo's Network Analyst. Using the "closest facility" command, the trailheads were uploaded as facilities and the residential properties as incidents. Executing the "solve" command in a second step then identified the shortest routes and calculated the distances from each property to the closest trailhead. Hierarchies among the street network data set were used to disallow the use of interstates and highways by bicyclists, though we allow bicyclists to ride one way streets in the wrong direction. Following the notion of the location rent model (Cheshire and Sheppard 1995) in that property values decline with increasing distance from the Central Business District, straight-line distances for each of the 1,762 properties to the CBD, that is, downtown Cincinnati, were calculated and included as an explanatory variable.

4 Model specifications and comparison

The main objective of the paper is to explain the variation in housing prices around the Little Miami Scenic Trail. The empirical hedonic model specification used in presented research is as follows:

$$\begin{aligned}\ln(\text{PRICE}) = {} & \beta_0 + \beta_1(\text{SQFT}) + \beta_2(\text{AGE}) + \beta_3(\text{LOTSIZE}) + \beta_4(\text{BASEMENT}) \\ & + \beta_5(\text{BRICK}) + \beta_6(\text{FIRE}) + \beta_7(\text{MATH}) + \beta_8(\text{TAXR}) + \beta_9(\text{NONRES}) \\ & + \beta_{10}(\text{INCOME}) + \beta_{11}\ln(\text{CBDDIST}) + \beta_{12}\ln(\text{TRAILD}) + \epsilon \end{aligned} \tag{1}$$

where PRICE refers to the market values of the included single-family residential properties and the explanatory variables are defined as in Table 1 above. We adopted the semi-logarithm (log-linear) functional form; partly due to its dominance in the relevant literature and partly to control for the large variation in house prices. To avoid multicollinearity problems, some of the highly correlated explanatory variables were excluded from the models. Altogether, twelve explanatory variables remained in our empirical model specification containing six structural housing characteristics (i.e., square footage, age, lot size, basement, brick construction, and fireplace), three school district variables (i.e., math proficiency test results, school district tax rate, percent of non-residential property values), two neighborhood variables (i.e., median

household income, distance to CBD), and the network distance between residential properties and the Little Miami Scenic Trail. The logarithmic transformation is used for both distances. We can directly interpret the estimates for each distance as the elasticity of assessed price with respect to amenity distance for a property with average characteristics.

Altogether, we used four different Bayesian estimation techniques, namely Ordinary Least Square (OLS), Spatial Autogressive Regression (SAR), Spatial Error Model (SEM), and Spatial Process (SP). While we will present all results from all four model specifications, we will pay specific attention to the impact the Little Miami Scenic Trail has on property values. The OLS model follows closely the standard hedonic pricing approach and as such does not account for spatial dependence of any kind.

Spatial dependence is based on the fact that economic actors (buyers, sellers, and realtors) take the values of neighboring residential properties into consideration when pricing a property. Though each property differs with respect to structural characteristics, each house shares with its neighbors those influences that are generated from almost identical "location" factors. Accordingly, nearby properties tend to be more similar than those that are located further away. In practical terms, this logic of a spatial autoregressive structure is implemented using a spatial weight matrix W that identifies neighboring observations. For presented research, we chose a row-normalized weight matrix W based on the 10 nearest neighbors. Further, we define a location index s for each property which varies continuously over D, the set of all possible locations in our study region. We define housing prices as $y(s)$ for all properties in our finite set of locations $s_1, s_2, \ldots, s_n$. One of our main foci of this research is to define different measurements for the covariance $\mathrm{Cov}(y(s_i), y(s_j)) = C(h)$, where h is the distance between site s_i and s_j. The interpretation of the spatial dependence as a consequence of omitted variables—a structural process—is the foundation of the SAR model (LeSage and Pace 2009). More specifically, latent influences not included in the study (i.e., omitted variables), such as lack of privacy along the trail, noise and crime issues, and/or the perceived distance to the trail, could influence residential property values. Given that it is very unlikely to account for all possible influences on property values, the SAR approach does account to some extent for these unobservable factors. The Spatial Autoregressive is expressed in its matrix form as follows:

$$Y = \rho WY + X\beta + \epsilon, \tag{2}$$

where $Y = (y_{s_1}, \ldots, y_{s_n})$ is an $n \times 1$ vector containing the housing prices, W is the $n \times n$ spatial weight matrix, β is the $k \times 1$ vector of parameters to be estimated, and $X = (X_{s_1}, \ldots, X_{s_n})'$ is the $n \times k$ matrix of explanatory variables, including an intercept term. Each error term ϵ is normally and identically distributed with a zero mean and a variance σ^2. The scalar ρ measures the strength of the spatial dependence.

Through spatially structured random effects in the disturbance process, the SEM assumes spatial autocorrelation only in the unobserved random part of the specification. The SEM in matrix notation is defined as follows:

$$\begin{aligned} y &= X\beta + u, \\ u &= \lambda Wu + \epsilon. \end{aligned} \tag{3}$$

where λ measures the strength of the spatial dependence in the spatial lag of the error terms, and each error term ϵ is normally and identically distributed with a zero mean and a variance σ^2.

A more complex spatial dependence structure is introduced in the SP. As Valente et al. (2005) emphasized, standard spatial econometric techniques (i.e., SAR and SEM) can have practical limitations as the correlation between locations is solely dependent on the initial definition of W and the inversion of W during the estimation procedure. The Spatial Process, on the other hand, is more flexible in that it allows modeling of complex spatial dependence structures beyond the standard approach. In our research, we followed geostatistical modeling techniques. Our spatial process model is of the following functional form:

$$y \sim N\left(X\beta, \tau^2 I_N + \sigma^2 H(\phi)\right), \tag{4}$$

where τ^2 is called the nugget; σ^2, the partial sill; and ϕ, the decay parameter. The spatial connectivity structure is embedded in the covariance function $C(h) = \sigma^2 H(\phi)$. More specifically, the $n \times n$ spatial correlation matrix H is defined by an isotropic function which depends only on the distance between locations, but is independent of the direction. In fact, the covariance function $C(h)$ between any two locations s_i and s_j depends only on the separation vector h. We model the covariance function using the Matérn form which is defined as follows:

$$C(h) = \begin{cases} \frac{\sigma^2}{2^{\nu-1}\Gamma(\nu)}(2\sqrt{\nu}h\phi)^{\nu} K_{\nu}(2\sqrt{\nu}h\phi) & \text{if } h > 0 \\ \tau^2 + \sigma^2 & \text{otherwise} \end{cases} \tag{5}$$

where the parameter ν controls the smoothness of realizations and ϕ is the spatial range parameter. The functions $\Gamma(.)$ and K_{ν} are the gamma function and the modified Bessel function of order ν, respectively. Depending on the parameter ν, the Matérn form can encompass different classes of covariance functions, including the exponential covariance function ($\nu = 1/2$) and the Gaussian covariance function ($\nu \to \infty$). The Matérn covariance function is crucial for the described SP in that it allows the estimation of the smoothness parameter ν. The differentiability of this function influences widely the outcomes of predicted values. Thus, choosing a suitable information prior for ν for the Bayesian estimation procedure is of major importance. Despite its more complex functional specification, the SP's significant advantage over the SAR and SEM models is that it allows the user to estimate the distance over which the spatial correlation is defined. The use of a separate covariance function, however, increases the computational complexity within the SP specification, as the spatial dependence between locations is not defined anymore through a sparse spatial weight matrix (see LeSage and Pace 2004). More specifically, the number of necessary computations increases to n^3 for n observations. To overcome indicated computational hurdle, we follow closely Banerjee et al. (2008) spatial predictive process approach for large data sets. The basic idea of the predictive process is to reduce the dimension of the covariance matrix by selecting a smaller data set with m representative observations from the originally observed n data points. The key is to select a small enough data set to

simplify the computational process, while containing enough information to estimate the underlying spatial process for the full data set of n observations. We will refer again to this selection process of representative locations in the section on predictions.

We have given preference to the Bayesian estimation procedure over more traditional estimation procedures, for instance, Maximum Likelihood, as these procedures cannot estimate the smoothness parameter ν in the spatial process (see LeSage and Pace 2009, for further information about the estimation procedure). The remaining three models were then estimated within the Bayesian framework to maintain comparability among all individual model specifications. For the Bayesian estimation process, the following hierarchical specifications were applied: the parameters β are all normally distributed, but non-informative. The measures for the strength of the spatial dependence, λ and ρ, as well as the range parameter ϕ, follow uniform distribution. We assigned inverse gamma priors for σ^2 and τ^2. Of course, all parameters are assumed to be independent. For assigning a prior for the smoothness parameter ν in the Matérn correlation function, we were guided by the fact that data seldom suggest a prior for ν of orders greater than 2 and accordingly assigned a uniform prior distribution of (0, 2) for ν. We further follow closely Banerjee et al. (2008) and define a lower cut-off value of 0.05 in the variance–covariance matrix for the effective range of the spatial dependence. In other words, correlations of less than 0.05 do not suggest significant spatial dependences and are therefore replaced by zeros in the matrix. Lastly, we implement a vague prior on ϕ with a uniform distribution that is defined on the interval (0.5, 30) and which corresponds to an effective spatial range between 100 and 6,000 feet for $\nu = 0.5$. We use the Deviance Information Criterion (DIC, Spiegelhalter et al. 2002) as our Bayesian model selection criterion to compare our four presented models with each other. The DIC is well suited whenever Markov Chain Monte Carlo simulations were used to obtain posterior distributions of the models. As such, the DIC is easily calculated from posterior samples and should be used only with Gaussian likelihoods such as described here. The DIC is defined as the sum of the deviance (a measure of model fit) and the effective number of parameters (a penalty term for model complexity). Lower DICs indicate better model performance and are preferred.

5 Analysis and discussion of empirical results

A cross-comparison of the DIC across all four empirical models highlights the superior overall model fit of the spatial process which has by far the lowest DIC with −2,701.7 (Table 3) and as such is our preferred model.[4] The SEM and the SAR model perform very similar as indicated by their DIC of −2,690.9 and −2,691.5, respectively. All three spatial model variants outperform the standard OLS model, which has the highest DIC with −2,660.2.

Turning to the parameters for the structural, neighborhood, and school district variables in Table 3, we conclude that all estimated parameters have the expected signs.

[4] Markov Chain Monte Carlo estimation results are based on a simulated chain where the first 5,000 samples are discarded as a 'burn-in' period, followed by 15,000 iterations that were collected to produce posterior summaries for the parameters of interest.

Table 3 Estimation results for OLS, SAR, SEM, and SP—20,000 iterations

Parameter	SP		SEM		SAR		OLS	
	Mean	*p* value	Mean	*p* value	Mean	*p* value	Mean	*p* value
Constant	7.745	0	6.887	0	6.644	0	7.724	0.000
	(6.933, 8.361)		(5.679, 8.030)		(5.805, 6.848)		(6.937, 8.464)	
TRAILD	−8.75E−02	0	−8.36E−02	0	−4.60E−02	0.005	−7.30E−02	0.000
	(−0.143, −0.0301)		(−0.109, −0.068)		(−0.0741, −0.0158)		(−0.101, −0.046)	
INC	2.23E−06	0	2.00E−06	0.061	−6.60E−08	0.4	2.00E−06	0.064
	(1.84E−06, 2.52E−06)		(1.20E−06, 2.60E−06)		(−5.00E−07, 3.80E−07)		(1.45E−06, 2.36E−06)	
SQFT	3.34E−04	0	3.30E−04	0	3.00E−04	0	3.82E−04	0.000
	(3.05E−04, 3.39E−04)		(3.10E−04, 3.40E−04)		(2.90E−04, 3.10E−04)		(3.70E−04, 4.02E−04)	
AGE	−2.38E−03	0	−2.30E−03	0	−1.80E−03	0	−0.002	0.000
	(−0.003, −0.002)		(−2.90E−03, −1.80E−03)		(−2.20E−03, −1.40E−03)		(−0.003, −0.001)	
LOTSIZE	4.96E−06	0	4.00E−06	0	4.00E−06	0	1.00E−05	0.000
	(3.77E−06, 5.94E−06)		(3.10E−06, 6.00E−06)		(3.30E−06, 4.70E−06)		(8.71E−06, 1.28E−05)	
BASEMENT	0.038	0.005	0.051	0	0.02	0.04	0.047	0.000
	(0.009, 0.067)		(0.030, 0.070)		(0.002, 0.04)		(0.026, 0.068)	
BRICK	0.049	0.155	0.03	0.03	0.052	0	0.013	0.211
	(−0.007, 0.073)		(0.004, 0.055)		(0.028, 0.076)		(−0.0132, 0.036)	
FIRE	0.28	0	0.211	0	0.212	0	0.226	0.000
	(0.241, 0.320)		(0.175, 0.243)		(0.185, 0.240)		(0.193, 0.252)	
MATH	0.032	0	0.052	0	0.032	0	0.032	0.000
	(0.025, 0.037)		(0.047, 0.058)		(0.027, 0.036)		(0.028, 0.0385)	
TAXR	0.007	0	0.004	0	0.005	0	0.011	0.000
	(0.009, 0.011)		(0.003, 0.005)		(0.004, 0.006)		(0.010, 0.012)	
NONRES	0.003	0	0.005	0	0.002	0.023	0.003	0.000
	(0.002, 0.004)		(0.004, 0.006)		(0.001, 0.004)		(0.002, 0.004)	

Table 3 continued

Parameter	SP		SEM		SAR		OLS	
	Mean	p value	Mean	p value	Mean	p value	Mean	p value
CBDDIST	0.067 (−0.021, 0.178)	0.144	0.114 (−0.032, 0.2361)	0.063	0.094 (0.009, 0.171)	0.006	0.082 (0.008, 0.149)	0.007
σ^2	0.721 (0.527, 0.926)	0.031	0.051 (0.050, 0.052)	0	0.041 (0.040, 0.041)	0	0.026 (0.024, 0.028)	0.000
τ^2	0.038 (0.030, 0.048)	0						
ϕ	12.9 (2.017, 28.581)	0.038						
ν	1.167 (0.554, 1.891)	0.018						
λ			0.568 (0.521, 0.593)	0				
ρ					0.293 (0.259, 0.330)	0		
DIC	−2,701.7		−2,690.9		−2,691.5		−2,660.2	

95 % HPDI in parentheses

The median household income by Census block group variable, however, is statistically insignificant in the SAR model. In addition, three of the explanatory variables are statistically insignificant in the SP model: the exterior wall structure (BRICK), the percent of property value that is class 2 (NONRES), and the distance to the Central Business District (CBDDIST). However, the SAR results are not directly comparable to the SEM and SP results, and precaution is thus necessary with respect to their interpretation. In fact, the SEM and SP specifications do not account for spillover effects onto neighboring properties. As such, a change in an explanatory variable in the SEM and SP models leads to a change only in the price for one particular property. Because of the presence of the inverse matrix $(I_n - \rho W)^{-1}$ in the reduced form of the SAR specification, spillover effects onto neighboring properties are implicitly included when changing an explanatory variable for a given location as specified in the spatial weight matrix W. To account for these spillover effects, LeSage and Pace (2009) propose a scalar summary measure that is composed of a direct plus an indirect effect, which allow further insight into the magnitude of the feedback effects through the spatial connectivity structure. The direct, indirect, and total effects for the SAR model are shown in Table 4 below. For instance, adding 100 square feet to the footprint of the structure would directly increase its value by 3.07 %, but also significantly impact the neighboring house prices by the magnitude of 1.2 %.

Regarding the Little Miami Scenic Trail, we can conclude that access to the trail does have a significant effect on single-family residential property values as long as these lie within 10,000 feet network distance to one of the twenty-three trail entrances.

The average residential property in our market value sample sold for $263517 and lies 5,772 feet away from the nearest trailhead. For the Spatial Process model, reducing the average property's distance to the trailhead by 1 % (or 58 feet) is equivalent to an increase in its market value by 0.000875 % (or $230.6). In other words, for every foot, a property is closely located to a trailhead, its value would increase by $3.98. For the same mean property value, the SEM and the SAR model show percent increases in house prices of 0.00046 and 0.0062 %, respectively.

Using Rosen's hedonic pricing method allows us to establish an empirical relationship that predicts the price of a residential property as a function of structural, neighborhood, and environmental characteristics. With respect to the primary focus of our study, we can now estimate an individual's "willingness to pay" (WTP) for having better access, that is, for being closer located to one of the numerous trailheads, to the Little Miami Scenic Trail. The individual's WTP to live closer to the trail constitutes an important benefit of the trail, which can be part of a cost-benefit analysis of the trail.

In addition to increased WTP, there are numerous other benefits, including improved health for trail users, stimulation of local economic development through increase in tourist spending, increase in community identity and pride, etc., which are beyond the scope of this analysis. Nevertheless, we would like to provide an evaluation of the total trail-related benefit in terms of property values for each school district, closely following Kiel and Zabel (2001). Calculating the individual WTPs for each school district and then multiplying them by the number of properties provide us with an estimate of the benefit of the trail on residential properties by school district. There are five different school districts lying in our study area: Mariemont, Indian Hills,

Table 4 Direct and indirect effects for SAR model—20,000 iterations

Parameter	Direct			Indirect			Total		
	2.5 %	Mean	97.5 %	2.5 %	Mean	97.5 %	2.5 %	Mean	97.5 %
TRAILD	−0.072	−0.044	−0.020	−0.029	−0.017	−0.008	−0.100	−0.062	−0.028
INC	−1.00E−06	−6.30E−08	3.40E−07	−2.30E−07	−3.10E−08	1.80E−07	−1.00E−06	−9.40E−08	1.00E−06
SQFT	2.94E−04	3.07E−04	3.20E−04	1.03E−04	1.20E−04	1.38E−04	4.02E−04	4.27E−04	4.54E−04
AGE	−0.002	−0.002	−0.001	−0.001	−0.001	−0.001	−0.003	−0.003	−0.002
LOTSIZE	3.00E−06	4.00E−06	5.00E−06	1.00E−06	2.00E−06	2.00E−06	5.00E−06	6.00E−06	7.00E−06
BASEMENT	−0.004	0.021	0.044	−0.002	0.008	0.018	−0.006	0.029	0.062
BRICK	0.024	0.053	0.084	0.009	0.021	0.033	0.033	0.074	0.117
FIRE	0.181	0.215	0.247	0.068	0.084	0.102	0.250	0.300	0.345
MATH	0.027	0.032	0.037	0.010	0.013	0.015	0.038	0.045	0.052
TAXR	0.004	0.005	0.007	0.002	0.002	0.003	0.006	0.008	0.009
NONRES	0.001	0.002	0.004	3.35E−04	8.71E−04	1.43E−03	0.001	0.003	0.005
CBDDIST	0.025	0.096	0.162	0.009	0.038	0.065	0.033	0.134	0.226

Loveland, Sycamore Community City, and Forest Hills Local that share the total trail-related benefit in the amount of $39.3 million. Seventy-nine percent of the total residential properties included in our study lie in one of the three larger school districts, for example, Mariemont, Indian Hills, and Loveland, the main beneficiaries of the trail. Following our calculations, the area of the Mariemont school district (see Fig. 1) receives the highest economic benefit from the trail with an estimated increase in property values of $16.3 million. Second is Indian Hill with a total benefit in increased property values of $10.5 million. Loveland, which has the largest number of relatively lower priced properties, still receives a total benefit of $8.6 million. The two other school districts, Sycamore Community City and Forest Hills Local, would have a benefit of $6.2 million and $0.7 million, respectively. Applying the different tax rates for each school district would generate a total revenue of $2.5 million for the study area.

With respect to the structural characteristics, we find that adding 100 square feet to the footprint of the mean-priced house adds between $7,906 and $8,696 (3.0–3.3 %), depending on which of the three model results we use. A 1-year increase in age of house, on the other hand, reduces the house price by $474 to $746 (0.180–0.283 %) and as such indicates a minimal influence of age on housing values. Also, the lot size is of lesser influence and adds a marginal $105 to $128 (0.04–0.05 %) to the mean house price for adding 100 square feet to it. Further, a full basement adds as much as 2.0–5.1 % to house prices, while an exterior brick wall adds another 3.0–5.2 % to it. However, we view the fireplace result (i.e., 21.1–28.0 %) with much reservation, as it can be argued that the fireplace result is a proxy for other non-included explanatory variables. Though results in this magnitude for qualitative indicator variable estimates are not unknown, their interpretation differs as they only refer to an upward or downward shift of the intercept. Confirming to prior expectations, the neighborhood and the school district are significant determinants of house prices. According to the spatial process, an increase in median household income by $10,000 adds as much as $5,876 to the mean house (2.23 %). Using the State of Ohio 9th grade math test rate and the gross tax rate by school district as indicators for the quality of the school districts, our results show clearly a positive relationship with house prices. More specifically, a 1-point increase in the 9th grade test rate and a 1-mill increase in the gross school tax rate are equivalent to a 3.2–5.2 and 0.5–0.7 % increase in house prices.

Our empirical results do further support the hypothesis of spatial dependence in house prices as shown in the results of the three spatial model specifications. Comparing the spatial strength parameters of the two spatial econometric models reveals that the strength of the spatial dependence λ in the SEM and ρ in the SAR model are significant and positive with estimated values of 0.57 and 0.29, respectively. With respect to the error structure of the Spatial Process, Table 3 shows that all four of the relevant parameters are statistically significant as well. The estimated partial sill (σ^2)—part of the spatial error component—is 0.721 at its mean and is statistically significant at the 5 % level (p value $= 0.031$). The nugget (τ)—the non-spatial error component—is 0.038 and statistically significant at the 1 % level (p value $= 0.000$). Comparing the partial sill to the nugget for $h = 0$, which refers to the main diagonal of $C(h)$ and denotes the variance in Y, implies that the spatial and non-spatial error components are approximately of equal importance. The parameter ν estimate, a reflector of the smoothness of the spatial process, is 1.167. Comparing this estimate of 1.167 to

ν values of 0.5 for the traditional exponential distribution, we conclude that our estimated covariance function is smoother than an exponential specification, but not as smooth as the Gaussian specification. The parameter ϕ, which controls for the decay in the spatial correlation, has an estimated value of 12.9. This estimate reveals a rather small range over which the spatial correlation is defined. For instance, using the two closed forms of the Matérn correlation function for $\nu = 0.5$ and $\nu = 1.5$, we obtain a range of 233 feet and 368 feet, respectively. Given the high level of heterogeneity in house prices that exists between the neighborhoods along the trail, this strong decay of spatial correlation was somewhat expected.

6 House price prediction

The prediction of the housing price for any location in the study area using estimated predictors is quite intuitive from a Bayesian point of view. This spatial process is a widely used prediction technique as its estimation is based on a sampling scheme. In other words, the estimation of the full posterior predictive distribution for any desired location conditioned on the observed distribution can be accomplished through the use of a set of representative sample locations: the knots. For this study, we implement a prediction technique first introduced by Banerjee et al. (2008) and subsequently improved by Finley et al. (2009) to forecast the house prices near the trail entrances. A modified predictive process is applied to large data sets in order to reduce the bias for the non-spatial variance term τ^2. This is based on the reduction in the original data set to a smaller representative set of knots through a process having spatially adaptive variances, in order to guarantee adequate properties for the covariance of the unobserved spatial effect for these sample locations. More specifically, we modified the predictive process by randomly selecting 558 knots from existing locations and then performed the spatial predictions with respect to the nearest trail entrances.[5] Figure 2 shows the distribution of the observed house prices and the distribution of the estimated house prices (in log) for the parcels around the entrances.

The fact that house prices can be predicted for the sample locations, results in an estimated property value surface map, which, in return, allows us then to obtain the property prices for any property that lies on the map. The contour lines are computed using bivariate linear interpolation. For comparison, the predictions for each trail entrance are presented in Table 5 below.

Housing prices can be predicted at arbitrary locations, and hence, new property prices can be obtained through an estimated property value surface. The contour lines are computed using bivariate linear interpolation. Predictions for each entrance are presented in Table 5.

According to Fig. 2, we identify the highest predicted property values with a mean value of \$581,287 [(exp(13.272)] around the third trail entrance in the Village of Mariemont, Ohio. With a mean value of \$442,856 [exp(13.001)], the second highest

[5] Since the spacing of the locations is relatively irregular, we could use a space-covering design (see Royle and Nychka 1998). To overcome this issue, we implement a larger numbers of knots making sure that results are robust to the selection of knots.

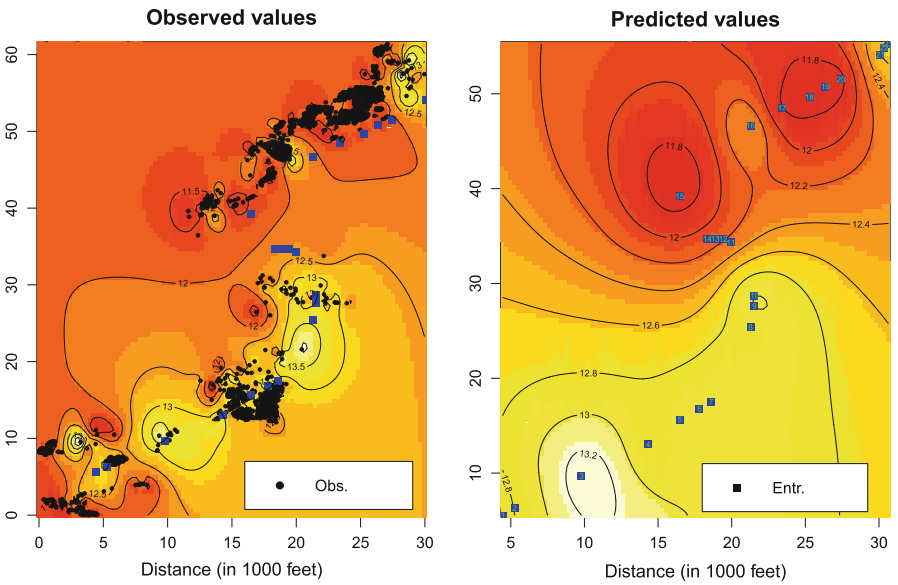

Fig. 2 Observed and predicted housing prices (in log) around the trail entrances

Table 5 Prediction for property values around trail entrances

Entrances	2.5 %	Mean	97.5 %	Entrances	2.5 %	Mean	97.5 %
Entr.1	11.636	12.747	13.923	Entr.13	10.798	12.139	13.455
Entr.2	11.781	12.808	13.854	Entr.14	10.822	12.102	13.436
Entr.3	12.163	13.273	14.306	Entr.15	10.524	11.724	12.932
Entr.4	11.876	12.836	13.747	Entr.16	11.133	12.323	13.505
Entr.5	12.005	12.921	13.879	Entr.17	10.768	11.812	12.862
Entr.6	11.918	12.965	14.021	Entr.18	10.513	11.765	12.944
Entr.7	11.881	12.923	13.981	Entr.19	10.693	11.768	12.846
Entr.8	11.542	12.817	14.085	Entr.20	10.601	11.762	12.852
Entr.9	11.892	13.001	14.143	Entr.21	11.317	12.594	13.919
Entr.10	11.777	12.987	14.067	Entr.22	11.378	12.596	13.779
Entr.11	10.775	12.261	13.565	Entr.23	11.516	12.620	13.913
Entr.12	10.907	12.182	13.633				

predicted property prices are in close proximity to the ninth trail entrance in the Village of Indian Hill. The lowest predicted valued properties with a mean value of $123,500 [exp(11.722)] lie around the fifteenth trail entrance in the City of Loveland. The comparison of observed and predicted house prices in Fig. 2 confirms our findings. Comparing predicted house prices in Table 5 with the summary statistics of observed prices in Table 2, we observe a smoothing out effect as predicted values do not show extreme outlying house prices as indicated in the summary statistics. Though we present a contour map of predicted house prices, we want to emphasize that this

prediction process allows us to obtain a joint predictive distribution for any location around the trail based on the means of the associated predictive distributions.

In a last step, we measure how well centered our predicted results for the OLS and the SP specifications are. To do so, we compare the OLS with the SP predictions using the value of mean square predictive error (MSPE) $\sum_{i=1}^{n}[(\widehat{Y_i} - Y_i)^2]/n$. For Y_i, we randomly selected 80 % of the original observations, while the remaining 20 % of the sample data (i.e., the hold out data) were used for our predictions and refer to $\widehat{Y_i}$. Our results show a MSPE for the OLS model as 0.0482, compared to a MSPE of 0.0405 for the spatial process. We conclude that using the SP specification is preferred over the OLS specification as indicated by the significant reduction in the predictive SSE. In other words, the predicted house prices in the SP specification are closer to the observed values than for the OLS specification indicating the superior performance of the spatial process.

7 Conclusion

It is well documented in the relevant literature that location matters for home buyers and as such is a major component in determining property values. In the presented paper, we showed that multi-purpose trails have a significant influence on the price of houses when they lie within close proximity to the trail, where the distance to the trail is calculated based on street network distances. More specifically, we estimated the influence of the Little Miami Scenic Trail in Hamilton County, Ohio, to devalue the average priced house in our sample by $3.98 when moving away from the trail by one foot.

In this paper, we compared the estimation results of four different procedures within the Bayesian framework. Overall, we conclude that all spatial model variants outperform the non-spatial OLS specification. In addition to the more widely used SAR model and the SEM, we implemented the Spatial Process (SP). This more recent geostatistical specification has been developed specifically to be used with larger data sets, while at the same time, implicitly modeling the underlying spatial structure in the data set. In this sense, the SP allows the implementation of a functional form which helps to understand the spatial relationships between properties based on distances from one another. Our results indicate that the Spatial Process improves the estimation results when compared to the more traditional spatial econometric models. However, the SP, like the SEM falls short of capturing spillover effects between neighboring properties, whereas the SAR model does capture these direct and indirect effects.

In the last section of the research, we presented a house price contour map for our study region. In other words, we predicted, based on a selection of representative knots, the conceptual prices for all properties included in our sample around all 23 trail entrances. Using the MSPE as a performance criteria, we show that the SP predictions of house prices are closer to the observed values than using the OLS predictions.

We conclude our research with the finding that trails do have a significant impact on the prices of surrounding properties. While we were able to account for spatial dependence in our sample data, we suggest that future research employs a more dynamic

setting with time-dependent variables and house prices being influenced by their neighboring properties.

Acknowledgments We would like to thank the University of Cincinnati for support of this research through an University Research Council (URC) Interdisciplinary Grant. We want to thank also David Brasington for providing us with data about school districts and tax rates, Thomas Wuerzer and Kat Haessler for their support with the ArcGis network analysis, and Andrea Yang for all of her editorial work.

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Rail-trails and Safe Communities

THE EXPERIENCE ON 372 TRAILS

RAILS to TRAILS CONSERVANCY

RAIL-TRAILS AND SAFE COMMUNITIES

The Experience on 372 Trails

Written by
Tammy Tracy & Hugh Morris
Rails-to-Trails Conservancy

in cooperation with

National Park Service
Rivers, Trails, and Conservation Assistance Program

JANUARY 1998

This report was conducted by Rails-to-Trails Conservancy
to document the extent of crime on rail-trails and review such crime
in a broader perspective.

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The purpose of
Rails-to-Trails Conservancy
is to enrich America's
communities and countryside
by creating a nationwide network
of public trails from former rail lines and connecting
corridors.

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ACKNOWLEDGMENTS

Rails-to-Trails Conservancy is grateful to all the trail managers who responded to our survey. The information provided made this study possible.

Thanks to Andy Clarke, Barbara Richey, and Susan Doherty for their invaluable assistance in getting this report through edits, revisions and production.

Photos — Front cover: Karen-Lee Ryan (Background), Patrick Kraich (trail patrol); Back cover: R. Leidelmeyer

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INTRODUCTION

At it's peak, the U.S. railroad network extended for almost 300,000 miles. More than half of this remarkable system has since become superfluous and in the latter half of the 20th century more than 2,000 miles of track annually have been abandoned or left unused by the railroad companies.

Since the early 1960's, efforts to preserve this part of our national industrial heritage have taken hold in community after community and more than 10,000 miles of former rail line have been opened as multi-use trails. In every state except Hawaii, people are bicycling, walking, running, in-line-skating, snow-mobiling and horseback riding on more than 950 rail-trails and there are plans for an additional 1,200 rail-trails stretching a further 18,000 miles.

…converting an abandoned rail corridor to a trail tends to reduce crime by cleaning up the landscape and attracting people who use the trail for recreation and transportation.

▼▼▼

While rail-trails are hugely popular and successful once they are open, during the development phase trail promoters often have to answer a wide range of concerns that local residents may have about the impact of the proposed trail on their community. Stories of trails attracting drug dealers, murderers and rapists are perpetuated by trail opponents with only a handful of newspaper headlines to back up their assertions rather than empirical research. Despite numerous studies that have concluded rail-trails do not generate crime, concerns persist and fear of the unknown continues to provide fertile ground for trail opponents. The research that has been conducted, along with anecdotal evidence, suggests that converting an abandoned rail corridor to a trail actually tends to reduce crime by cleaning up the landscape and attracting people who use the trail for recreation and transportation.

Recognizing the need to address these concerns, Rails-to-Trails Conservancy (RTC) conducted a survey of all rail-trail managers in an effort to document the level of crime on trails and identify the mitigation measures used by trail designers and managers. The objectives of this study were threefold: 1) to document the levels of crime on urban, suburban and rural rail-trails with current statistics and comprehensive data, 2) to examine trail management strategies that can mitigate crime and improve trail safety, and 3) to put crime on trails in perspective. A summary of past studies, our methodology, results, recommendations and several case studies follow.

PREVIOUS RESEARCH

Four separate studies conducted between 1979 and 1997 concluded that rail-trails do not increase crime.[1]

A study of the Burke-Gilman Trail in Seattle, Washington relied on interviews with local police officers and residents adjacent to the 12-mile urban rail-trail. The study found that incidents of vandalism and burglary did not increase as a result of the trail. To the contrary, the rate of vandalism and break-ins to adjacent property was well below the neighborhood average. Police said that they did not anticipate crime being a problem as long as motor vehicle use on the trail was prohibited, citing that the separation of a criminal from his/her escape vehicle as being a primary deterrent.

In the Minnesota study, the Department of Natural Resources interviewed property owners near the proposed Root River Trail in southeastern Minnesota and the proposed Soo Line Trail in eastern Minnesota. The study also interviewed property owners adjacent to the existing Douglas Trail near Rochester and the Heartland Trail in northern Minnesota. The study concluded that residents adjacent to existing rail-trails experienced much less crime than was anticipated by residents near proposed rail-trail projects.

A National Park Service study of the 26-mile Heritage Trail in rural Iowa, the 16-mile St. Marks Trail through small communities in Florida, and the 8-mile Layfayette/Moraga Trail in suburban San Francisco found that property owners experienced relatively few problems resulting from the existence of a rail-trail. Most adjacent property owners reported that rates of vandalism, burglary and trespassing had remained the same or decreased since the opening of the trail. The majority of property owners interviewed in the National Park Service study reported that living near a trail was better than they expected and also better than living near unused rail corridors.

A recent survey of residents near the Mohawk-Hudson Bike-Hike trail in New York asked respondents to comment on twelve potential problems that could arise from the trail. The respondents ranked each potential problem on a scale of one to five, with one being "not a problem" to five being a "major problem." The items that were ranked highest as being a major problem were litter (14% of respondents), illegal motor vehicle use (12%), and disruptive noise from the trail (12%). For these three items the percentage of users who indicated that these were not a problem at all was 41%, 44%, and 45%, respectively.

All four studies found that while some residents were apprehensive about rail-trail projects most did not experience problems after the trail's opening. In fact, many became users of the trail and the majority recognized the trail's economic and health benefits to the community. The Burke-Gilman and the National Park Service studies both found rail-trails to have a slightly positive effect on property values in adjacent neighborhoods, further testimony to the safety and benefit of rail-trails.

METHODOLOGY

RTC used several methods of data collection for this report.

In January 1997, RTC mailed surveys to the managers of all known open rail-trails (861) in the United States based on contacts maintained in RTC's database of rail-trails. This survey asked trail managers to report any crimes against persons or property committed on their trails during the years of 1995 and 1996. The survey listed several types of crime in each category for the respondent to consider. The survey also asked questions regarding the use of such safety features as lights, phones and posted warnings. Finally, the survey asked about the existence, mode and frequency of trail patrols. From this effort, RTC received 372 usable responses, a 43% response rate, reflecting a diverse set of trail types, lengths and geographic locations. Trail types included 36 urban, 81 suburban and 255 rural trails.[2] The length of these trails ranged from one-fifth of a mile to 145 miles. Geographic representation was quite broad with 38 of the 49 states that currently have at least one rail-trail responding.

A local patroler makes his rounds on the Illinois Prairie Path. (Jean Mooring)

In June 1997, RTC collected supplementary statistical and anecdotal information on the impact of rail-trails upon local crime. Using contact information provided by survey respondents, RTC sent letters to thirty local law enforcement agencies[3] with questions regarding impact of the rail-trail on crime, the presence of trail users as a crime deterrent and comparisons of crime on the trail to the crime in surrounding areas. Twelve of these agencies
responded, a 40% return, with letters regarding the safety of rail-trails. Finally, in July 1997, RTC conducted phone interviews with several coordinators of volunteer and professional rail-trail patrols to discuss the operation of their patrols. RTC compiled information on the organization, objectives and success of seven urban, suburban and rural trail patrols.

STUDY FINDINGS

The summarized results appear in the following four sections, major crimes, minor crimes, design strategies and trail patrols.

Major crimes are, defined for the purpose of this report, as those crimes against persons including mugging, assault, rape and murder. Minor crimes are those against property including graffiti, littering, sign damage, motorized trail use, trespassing and break-ins to adjacent property. Quotations from law enforcement letters are included in the text where appropriate. The complete text of the letters appears in Appendix A.

Figures for the actual number of incidents of crimes against persons are reported whereas the incidents of property crimes are expressed by the number of trails reporting any occurrence during the year. This was done because of the difficulty in quantifying some of the types of minor crimes such as litter or graffiti incidents.

Overall, results from the study indicate that rail-trails are safe places for people to be. The study also found that trail managers often employ preventative design strategies and patrols to reduce the possibility of crime and improve the efficient management of the trail.

MAJOR CRIMES

Out of 372 trails included in this study, RTC found only eleven rail-trails in 1995 and ten rail-trails in 1996 which had experienced any type of major crime, 3% of responding trails.

> *"The trail does not encourage crime, and in fact, probably deters crime since there are many people, tourists and local citizens using the trail for many activities at various hours of the day."*
>
> — Pat Conlin, Sheriff
> Green County, Wis.

These figures are very low considering the 372 trails surveyed cover nearly 7,000 miles of trail and more than 45 million estimated annual users.[4] Letters from law enforcement agencies support these findings. They consistently report that rail-trails do not encourage crime; rather, several letters cited heavy trail usage as a crime deterrent in areas of former isolation:

> *"The trail has not caused any increase in the amount of crimes reported and the few reported incidents are minor in nature...We have found that the trail brings in so many people that it has actually led to a decrease in problems we formerly encountered such as underage drinking along the river banks. The increased presence of people on the trail has contributed to this problem being reduced."*
>
> — Charles R. Tennant, Chief of Police,
> Elizabeth Township, Buena Vista, Pa.

Following is a summary of major crimes on rail-trails by urban, suburban and rural areas as well as a comparison to national crime figures. Although directly comparable statistics were not available, violent crime rates from the FBI's 1995 Uniform Crime Report provide some comparison by showing the number of crimes per 100,000 inhabitants in urban, suburban and rural areas.[5] When compared to rates of rail-trail crime, these figures provide a sense of how infrequently crimes on rail-trails occur. The results are presented in Table 1 and followed by discussion.

TABLE 1

Comparisons of Incidence Rate of Major Crimes on Rail-trails to U.S. Crime Rates.

	URBAN		SUBURBAN		RURAL	
CRIME	1995 National[1]	Rail-Trails[2]	1995 National[1]	Rail-Trails[2]	1995 National[1]	Rail-Trails[2]
Mugging	335	0.53 (1995) 0.30 (1996)	102	0.00 (1995) 0.01 (1996)	19	0.00 (1995) 0.01 (1996)
Assault	531	0.58 (1995) 0.34 (1996)	293	0.02 (1995) 0.01 (1996)	203	0.01 (1995) 0.01 (1996)
Forcible Rape	43	0.04 (1995) 0.00 (1996)	29	0.00 (1995) 0.00 (1996)	26	0.01 (1995) 0.01 (1996)
Murder	11	0.04 (1995) 0.01 (1996)	4	0.01 (1995) 0.01 (1996)	5	0.01 (1995) 0.01 (1996)

1. Note: Rates per 100,000 population; FBI Uniform Crime Reports for 1995.
2. Note: rates per 100,000 users; RTC survey results.

MAJOR CRIMES ON RAIL-TRAILS

URBAN RAIL-TRAILS

RTC found the crime rates on urban rail-trails to be very low compared to the national crime rate for urban areas. Note that one urban trail located in South Boston, Massachusetts is where the majority of personal crimes were experienced:

- Each year, an estimated 5 million people use the 36 urban rail-trails surveyed, covering 332 miles.
- The national rate of urban muggings is 335 per 100,000 inhabitants[6]; two urban rail-trails reported muggings (26 incidents) in 1995 and only one trail reported muggings (15 incidents) in 1996.
- The national rate of urban assaults is 531 per 100,000 inhabitants; only three urban rail-trails reported assaults in 1995 (29 incidents) and 1996 (17 incidents).
- The national rate of forcible rape in urban areas is 43 per 100,000; one urban rail-trail reported two rapes in 1995 and no rapes were reported in 1996.
- The national urban murder rate is 11 per 100,000 urban inhabitants; one urban rail-trail reported two murders in 1995. None of the urban rail-trails reported murders for 1996.

SUBURBAN RAIL-TRAILS

RTC found crime rates on suburban trails to be even lower than on urban rail-trails. The rate of crime on rail-trails was also low compared to national statistics of overall suburban crime.

- An estimated 14 million people use more than 1,100 miles of trail on the 82 suburban trails surveyed.
- The national rate of suburban muggings is 102 per 100,000 inhabitants; none of the suburban rail-trails reported muggings for the year of 1995 and only one mugging was reported in 1996.
- The national rate of suburban aggravated assaults is 293 per 100,000 inhabitants; three assaults occurred on three suburban rail-trails in 1995 and only two assaults occurred on suburban rail-trails in 1996.
- The national rate of suburban rape is 29 per 100,000 persons; none of the suburban rail-trails reported a rape in 1995 or 1996.
- Nationally, four murders per 100,000 inhabitants occur in suburban areas; there were no reports of murder on suburban rail-trails in 1995 or 1996.

RURAL RAIL-TRAILS

Major crimes occurred with even less frequency on rural rail-trails than on urban or suburban ones. These rates are also low compared to overall rural crime rates.

- There are an estimated 26 million annual users on the 254 surveyed rural trails covering 5,282 miles.
- The national rate of mugging in rural areas is 19 per 100,000 inhabitants; none of the rural rail-trails reported muggings in 1995 and only one reported an incident in 1996.
- The national rural rate of aggravated assault is 203 incidents per 100,000 persons; only three rural rail-trails reported three assaults in 1995 and the same number in 1996.
- Nationally, there were 26 forcible rapes per 100,000 rural inhabitants; two rural rail-trails reported rapes in 1995 and one trail reported a rape in 1996.
- The national murder rate for rural areas is 5 per 100,000; none of the rural rail-trails reported a murder over the two year period.

▼▼▼

MINOR CRIMES

According to our survey findings, only one-fourth of the rail-trail managers reported any type of minor crime, such as graffiti or littering and these problems were quickly corrected as part of routine trail management. The data indicates the occurance of each infraction rather than the actual number of incidents.

Letters from law enforcement officials attest that the actual volume of incidents such as graffiti, littering, sign damage and motorized use were minimal. In fact, one letter noted that litter was virtually nonexistent on a section of converted rail, but was overwhelming on portions which had not been converted to trail, again highlighting the benefits of converting an abandoned rail corridor to a trail:

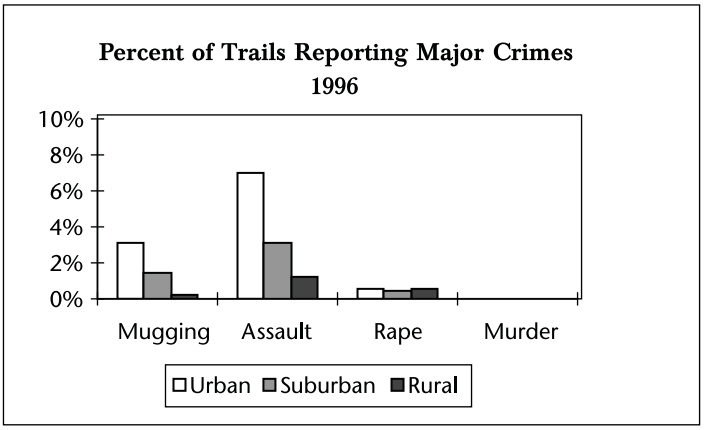
> *"My family and I took part in a community clean-up day. ...By the end of the mile and a half, we had found ONE piece of litter almost too small to have noticed. ...once you leave the path and continue where the railway line had been, the trash and graffiti are overwhelming."*
>
> — Ross L. Riggs, Chief of Police
> Louisville, Ohio

Moreover, RTC found that the majority of the property crimes committed on rail-trails had only a minor effect on the trail and usually did not harm adjacent private property. The following letter indicates that trails make good neighbors.

> *"Since the trail was constructed and opened for use we have found that the trail has not caused any inconvenience to property owners along the trail. The residents seem to enjoy having the trail near their homes."*
>
> — Charles R. Tennant Chief of Police,
> Elizabeth Township, Buena Vista, Pa.

A breakdown of the property crimes committed on rail-trails in urban, suburban and rural areas in 1996 and some comparisons to national averages follow.[7] The results are presented in Table 2 and followed by a discussion.

FIGURE 1



Many trails close at dark and patrols help to clear them. (Karen Stewart)

TABLE 2

Comparison of Incidence Rate of Minor Crimes on Rail-trails
to U.S. Crime Rates & Percentage of Trails Reporting Types of Crime in 1995.

CRIME	URBAN		SUBURBAN		RURAL	
	National[1]	Rail-Trails[2]	National[1]	Rail-Trails[2]	National[1]	Rail-Trails[2]
BURGLARY	1,117	0.00%	820	0.01%	687	0.01%
TRESPASSING	N/A	5%	N/A	3%	N/A	4%
GRAFFITI	N/A	26%	N/A	17%	N/A	12%
LITTERING	N/A	24%	N/A	24%	N/A	25%
SIGN DAMAGE	N/A	22%	N/A	22%	N/A	23%
MOTORIZED USE	N/A	18%	N/A	14%	N/A	23%

1. Note: Rates per 100,000 population; FBI Uniform Crime Reports for 1995 for 1995 for burglary.
2. Note: rates per 100,000 users; RTC survey results for burglary. Results for other crime types reported as percentage of trails experiencing that type of crime.

URBAN RAIL-TRAILS

Very few incidents directly affecting urban property owners occurred.

- The national rate of burglary in urban areas is 1,117 incidents per 100,000 inhabitants; none of the urban rail-trails reported burglary to adjacent homes in 1996.
- Only 5% of urban rail-trails reported trespassing
- 26% of the urban rail-trails reported graffiti.
- 24% of the urban rail-trails reported littering.
- 22% of the urban rail-trails reported sign damage.
- 18% of urban rail-trails reported unauthorized motorized use.

SUBURBAN RAIL-TRAILS

Incidents of graffiti and unauthorized motorized usage occurred less frequently on suburban rail-trails than on urban ones. The number of suburban trails reporting crimes directly affecting adjacent property owners was significantly lower than the rates of trail vandalism.

- The national rate of suburban burglary is 820 incidents per 100,000 inhabitants; only one suburban trail reported a break-in to adjacent property in 1996.
- 3% of suburban trails reported trespassing.
- 17% of the suburban trails reported graffiti.
- 24% of the trails reported littering.
- 22% of the trails reported sign damage.
- 14% of the suburban trails reported unauthorized motorized usage.

RURAL RAIL-TRAILS

Rural rail-trails reported fewer incidents of graffiti than both urban and suburban trails. Other incidents occurred at about the same rate. Again, crimes directly affecting adjacent property were rare.

- The national burglary rate in rural areas is 687 incidents per 100,000 inhabitants; only three of the rural trails reported a break-in to adjacent property in 1995 and three in 1996.
- 4% of rural trails reported trespassing.
- 12% of rural trails reported graffiti.
- 25% of the rural trails reported littering.
- 23% of the rural trails reported sign-damage.
- 23% of the rural trails reported unauthorized motor use.

▼▼▼

RECOMMENDATIONS

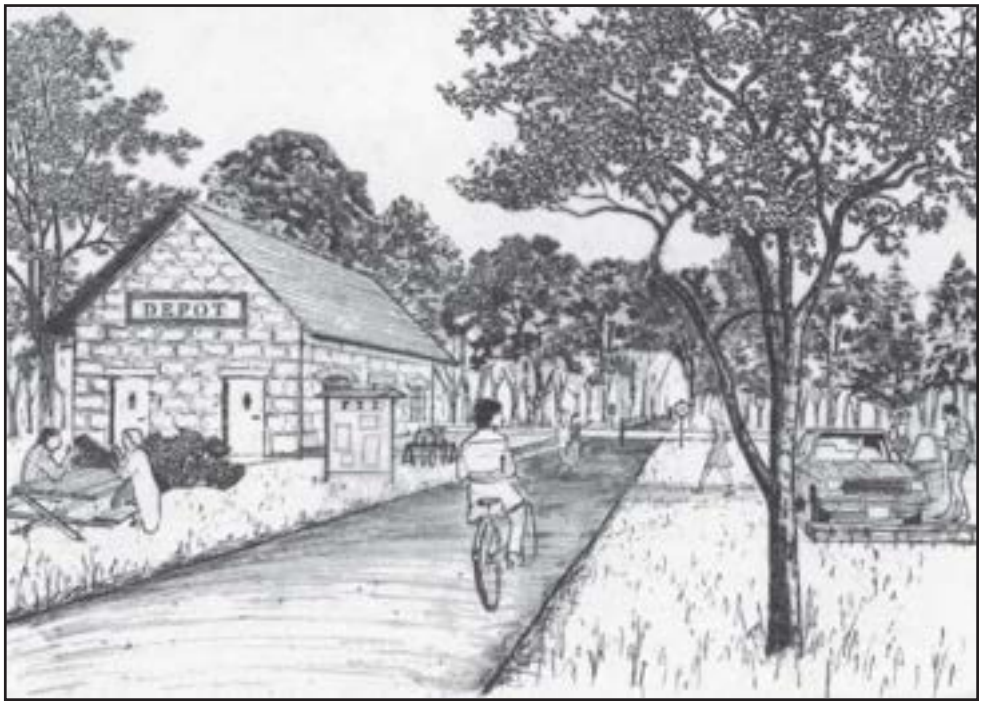
Although this study shows that rail-trail crime is rare, it is nonetheless a legitimate concern for residents and trail users and should be treated accordingly. There are several methods for addressing such concerns and minimizing the potential for crime.

Encouraging trail use is one way to help ensure trail safety, as the presence of other users helps to minimized undesirable behavior. In addition, trail users should exercise common sense when using trails after dark and remain aware of their surroundings at all times. Several other mitigation strategies help suppress criminal behavior and lessen the impact of incidents that do occur. In particular, trail design features and trail patrols are useful to keep in mind and recommendations for their implementation are included in this section. However since every rail-trail environment is unique, trail managers should assess the need for these strategies on an individual basis.

TRAIL DESIGN

Good trail design is an effective way of promoting trail safety. In most cases, the design of the trail should eliminate overgrown vegetation and tall shrubs in order to minimize hiding places along the trail and maintain long sight lines for users. Trail managers may also choose to place security lighting at trail heads and in parking lots to improve trail safety. Emergency phones or call boxes and emergency vehicle access are also important safety features for some trails. Additionally, keeping all trail corridors clean and well-maintained increases the feeling of community ownership of the trail and reduces the incidents of minor crime such as litter, graffiti and vandalism. Prohibiting motorized use of the trail deters property crime.

RTC found that several trails utilized the above design strategies in order to improve safety. The survey found that at the trail head 18% of the trails installed lights, 12% installed phones, and



From *Trails for the Twenty-First Century*, edited by Karen-Lee Ryan. page 132.

51% posted warnings or rules for trail users. Along the trail, 8% of the trails installed phones, 8% had lights and 45% posted warnings or trail rules. Unfortunately, the data collected in this survey was too limited to explore the correlation between the existence of design features and crime rates.

TRAIL PATROLS

Volunteer or professional trail patrols are also beneficial in improving trail safety. These patrols range from informal monthly clean-up and maintenance crews to daily patrols that provide maps, information and emergency assistance. The primary function of these patrols should be to educate trail users and to provide assistance when necessary. They should also be equipped to alert emergency services quickly if needed. Above all, the presence of a patrol deters crime and improves users' enjoyment of the trail.

Trail patrol members are on hand at an evening event in Gainsville, Florida. (Karen Stewart,)

Bike patrol police on the Capital Crescent Trail, Maryland. (Patrick Kraich)

According to survey results, the majority of trails have some type of trail patrol. The survey found that 69% of the urban rail-trails, 67% of suburban rail-trails and 63% of rural rail-trails are patrolled in some way. Local, county, and state entities, park rangers and volunteers provide these patrol services either alone or in combination. RTC found that 20% of the trails have local law enforcement patrols, 16% of the trails have county patrols, 4% of the trails have state patrols, 9% of the trails have park ranger patrols and 3% of the trails have volunteer patrols. The dominant modes of trail patrol are bike (26%) and car or truck (33%). The study found that 82% of the trails have access for emergency vehicles.

TRAIL PATROL CASE STUDIES

There are many methods of organizing an effective trail patrol. Depending on a trail's needs and available resources, a daily, weekly or monthly patrol may be appropriate.

Below are several examples of volunteer and professional patrols and contact information for their coordinators. These examples are only a few ways to promote safety and improve users' enjoyment of rail-trails. Trail managers should be creative in using "friends of the trail" groups, local community organizations and law enforcement to maintain and monitor local rail-trails.

MINUTEMAN TRAIL
MASSACHUSETTS

Several years ago as part of a public relations effort, the Bedford Police began riding bikes along the Bedford to Lexington portion of the Minuteman Trail. Approximately a year and a half later, they initiated a unique youth patrol, the Bedford Police Explorers to assist them. After completing first aid and CPR certification, the Explorers began conducting daily patrols of the trail wearing police t-shirts and carrying radios and first aid kits. Both the police and Explorer programs have been well received by the community. After seeing an officer and several Explorers clearing debris from the trail, one trail user wrote to the Bedford Police: "I was so taken by this... by clearing the bike path, now even more women, men, children of all ages and people in wheelchairs can enjoy nature in the path." Contact Officer Jeff Wardwell at the Bedford Public Safety Department for more information on the Explorer program, (617) 275-1212, ext. 125.

NORTH AUGUSTA GREENEWAY
SOUTH CAROLINA

Approximately twenty professionally trained police officers voluntarily patrol the three-mile North Augusta Greeneway in rural South Carolina. The effort began as part of a community policing and physical fitness program of the North Augusta Public Safety Department. Three to four times each week, officers patrol the trail as they perform walking, jogging or biking workouts. Captain Lee Wetherington, coordinator of the patrol effort, explained their objectives, "We try to show a presence, deter illegal activity and provide first aid or other assistance to trail users." The patrol is a creative way of keeping officers in condition for duty while promoting trail safety at the same time. For additional information about the patrol, contact Capt. Wetherington at (803) 441-4254.

PINELLAS TRAIL
FLORIDA

The 35-mile Pinellas Trail is patrolled daily by one of the most extensive volunteer patrols, the Pinellas Auxiliary Rangers. The Auxiliary Rangers serve as uniformed ambassadors for the Pinellas Trail, providing trail information, directions and bicycle safety tips. More than 25 volunteers, 18 years and older, comprise the patrol and are required to under-go background checks and extensive training on trail history, public relations, trail-riding, first aid and nutrition. The majority of the volunteers patrol by bike and use cell phones to communicate. Because the trail has not encountered many problems, an Auxiliary Ranger's primary role is one of educator rather than enforcer. For more information, contact Jerry Cumings or Tim Closterman at the Pinellas County Park Department, (813) 393-8909.

YOUGHIOGHENY RIVER TRAIL-NORTH
PENNSYLVANIA

Three local trail councils, headed by the Regional Trail Corporation, coordinate monitoring teams for the 23-mile Youghiogheny River Trail-North in southwestern Pennsylvania. Each of the trail councils oversees a team of approximately twenty monitors patrolling primarily on bikes, but also by foot and by horse. Easily recognizable in their gold and black uniforms, monitors carry first aid kits and, frequently, cellular phones to report trail damage or injuries. Joe Honick, who instituted this model monitoring program, explained their usefulness, "The monitors serve as the eyes and ears of the Regional Trail Corporation. They assist trail users, explain trail rules and relay users' suggestions and comments."

Bob McKinley, Trail Manager of the Regional Trail Corporation reported very few incidents of trail damage or graffiti along the trail. "There is so little vandalism, every piece seems like a major item," he said. The patrol program has been successful in deterring such incidents. McKinley commended the patrol efforts, "The patrols are doing a great job. Their monitoring really does make a difference." For more information on the trail's monitoring program, contact Joe Honick of the Mon/Yough Trail Council at (412) 829-0467.

GREAT RIVER TRAIL
ILLINOIS

The Great River Trail Council uses several groups to patrol its 28-mile trail passing through urban, suburban and rural areas. The council coordinates local bicycle and service clubs which have an interest in assisting with trail patrol. Clubs provide trail users with directions and look for maintenance problems. In the summer months, at least one group patrols during daylight hours and police patrol the trail after dusk. For more information, contact Patrick Marsh at the Great River Trail Council, (309) 793-6300.

BALTIMORE AND ANNAPOLIS TRAIL PARK
MARYLAND

Approximately thirty volunteer Trailblazers, ranging from age eleven to 78, patrol the 13-mile Baltimore and Annapolis Trail. After receiving three weekends of first aid, CPR, patrol technique and park operations training from park rangers, they take to the trail by in-line skates, bike or foot. Trailblazers supplement park rangers' daily patrols by providing information to trail users, correcting unsafe trail behavior and reporting their findings to the park rangers. Trailblazers are able to quickly identify and repair problem areas of litter or graffiti helping to prevent further incidents from occurring. For more information on the organization or training of the Baltimore and Annapolis Trailblazers, contact David Dionne, Park Superintendent at the Anne Arundel County Department of Recreation and Parks, (410) 222-6245.

LAFAYETTE/MORAGA TRAIL
CALIFORNIA

Several entities monitor the 8-mile Lafayette/Moraga Trail in the San Francisco Bay Area, including a maintenance team, the East Bay Regional Park District Public Safety Department and several volun-teer patrols. More than 150 equestrians, bicyclists and hikers comprise volunteer groups who patrol the Lafayette/Moraga Trail and other parks in the area. An officer from the Park District provides each group with training and organizes monthly meetings and speakers. In 1996, volunteers provided over 40,000 hours of service to the East Bay parks. For more information on these patrols, contact Steve Fiala at the East Bay Regional Park District,
(510) 635-0135.

RAIL-TRAILS AS SAFE PLACES

Rail Trails are not crime-free. No place on earth can make that claim. However, when compared to the communities in which they exist, compared to highways and parking lots, and compared to many other public and private places, rail-trails have an excellent public safety record.

Compared to the abandoned and forgotten corridors they recycle and replace, trails are a positive community development and a crime-prevention strategy of proven value. By generating lawful activities such as walking, running, bicycling and in-line-skating, rail-trails are also bringing communities together and reintroducing neighbors to each other.

Trails are actually one of the safest places to be and the incidence rate of crime on trails is minor in comparison to other locations. Table 3 lists the percentage of rapes, robberies, and assaults that occur in four locations. As these data show, a park is actually one of the safest places to be. Two to three times safer than being in a parking facility or in your own home and many more times safer than walking down the street. These data help to provide some perspective of personal safely in several types of locations in the context of overall crime rates in the U.S. The result being that parks are undeniably one of the safest places to be.

In an attempt to add perspective to crime on trails, John Yoder, President of the Friends of the Pumpkinvine Nature Trail, Inc. in Indiana has compiled crime and injury statistics for a variety of circumstances to make the point that no human activity is risk free. The entire contents of his list can be found in Appendix B.

TABLE 3
National Crime Statistics by Location

CRIME		LOCATION (% OF TOTAL)			
		PARK/FIELD/ PLAYGROUND	PARKING GARAGE/LOT	INSIDE YOUR HOME	ON STREET
RAPE	(1988)	6.6	7.9	25.0	23.3
	(1990)	0.5	3.4	35.0	30.2
	(1991)	1.1	4.2	26.8	10.4
	(1992)	8.5	6.5	16.3	38.3
ROBBERY	(1988)	3.0	11.6	14.0	48.3
	(1990)	3.0	12.7	9.4	48.6
	(1991)	3.6	11.9	9.5	51.2
	(1992)	6.4	13.6	10.1	20.7
ASSAULT	(1988)	3.6	0.3	15.1	30.5
	(1990)	4.0	7.9	13.4	31.9
	(1991)	4.0	10.7	10.7	29.7
	(1992)	4.4	7.3	7.3	32.3

Note: Percentages do not add to 100 because not all location categories are listed.
Source: Statistical Abstract of the United states, various years

Yoder concludes by asking "Does this mean we should outlaw, eliminate, or ban any of these places or activities?" Of course not! But as these statistics demonstrate, every form of human activity has some level of risk associated with it. The question in judging any activity is understanding the level of risk associated with that activity and doing everything possible to minimize those risks. Our society accepts approximately 40,000 highway deaths every year because we believe the convenience of highway travel is worth the risk. Similarly, in 1992 there were 30 murders, 1,000 rapes, and 1,800 robberies on college campuses however, most people believe that the rewards associated with a college education are worth the risks involved.

It is important not to trivialize or deny that bad things can happen on trails, however it is equally important to keep in mind that the amount of crime that occurs on trails as demonstrated by the survey results as well as the data in Table 3 shows that crime on trails is minimal. As with any activity, appropriate safety precautions should be taken to minimize risk.

CONCLUSION

With nearly 27,000 miles of open and project rail-trail, Rails-to-Trails Conservancy recognizes that addressing trail users safety and trail neighbors concerns about crime are critical to the creation of a successful trail. This report has shown that crime on rail-trails is not a common occurrence.

Past studies, our survey results, letters from law enforcement officials, and comparisons to national crime figures all indicate that rail-trails are safe places for local residents and visitors to enjoy. While common sense and preventative measures should be used on rail-trails to ensure the lowest possible levels of crime, rail-trails remain much safer than many other environments. The findings of this report should reassure those with apprehensions about trail projects that converting a former rail corridor into a trail will have a positive rather than negative effect on their community.

As the data in this report show, crime on rail-trails is minimal. This becomes all-the-more apparent when put in perspective with risks associated with other activities. The way to minimize crime on trails is to ensure that users exercise proper safety precautions, keep the trail well maintained, and boost trail use. Crime generally does not occur in places where there are lots of people and few hiding places. Positive-looking places tend to encourage positive behavior.

Crime occurs on roads, parking lots, in shopping malls, office buildings, airports, and at zoos. However, no one would rationally argue that we shouldn't build any of the above because crime will occur there. The same should be true for trails.

APPENDIX A: LETTERS FROM LOCAL LAW ENFORCEMENT AGENCIES

CITY OF NORTH AUGUSTA

P. O. BOX 6400 NORTH AUGUSTA, SC 29841-0400
General Information - 803 / 441-4399 FAX - Administration 441-4203 / Public Safety 441-4252

May 7, 1997

Mr. Hugh Morris, Research Coordinator
Rails to Trails Conservancy
1100 Seventeenth Street, N.W., 10th Floor
Washington, DC 20036

Dear Mr. Morris,

In response to your letter of May 1, 1997 I would offer the following information:

The North Augusta Greeneway project has been a tremendous success for the City of North Augusta and its citizens. You might imagine that any project such as this which attracts the public to its use will generate activity for the police department.

While we have had a few instances of unauthorized four wheelers and a few bicycle mishaps which caused a police action we have had no crime to speak of occurring on the Greeneway or that we could attribute to the Greeneway.

The area in which this trail runs through is a compromise of upper middle level neighborhoods, wooded secluded areas, older established neighborhoods and existing city parks.

The police department has had no significant increase or decrease in the amount of crime in any of these areas.

In response to the question, "Was the development of the trail a good idea?" I would, from a police point of view and a citizen's point of view, reply emphatically that it was a great idea. The trail use grows continuously and we have implemented a part-time bike patrol to ride the Greeneway as a part of our community policing initiatives.

The only suggestion I could make would be to provide some type of emergency call stations along the trail to summon police or medical help when needed.

I hope this information provides what you need.

Sincerely,

DEPARTMENT OF PUBLIC SAFETY

T. Lee Wetherington, Captain

441-4202 Administration | 441-4223 Engineering | 441-4215 Finance | 441-4300 Parks/Recreation | 441-4227 Planning/Codes | 441-4251 Public Safety | 441-4223 Public Works/Utilities

ELIZABETH TOWNSHIP POLICE DEPARTMENT

522 ROCK RUN ROAD · BUENA VISTA, PA 15018
(412) 751-7325 · (412) 751-3399 · FAX (412) 751-7329
CHARLES R. TENNANT, *Chief of Police*

May 15, 1997

Mr. Hugh Morris
Rails to Trails Conservancy
1100 Seventeenth Street
10th Floor
Washington, DC 20036

Dear Mr. Morris,

The Elizabeth Township Police Department is responsible for patrolling and enforcing the laws on the Youghiogheny River Trail which traverses 13.6 miles through Elizabeth Township.

Since the trail was constructed and opened for use we have found that the trail has not caused any inconvenience to property owners along the trail. The residents seem to enjoy having the trail near their homes.

The trail has not caused any increase in the amount of crimes reported and the few reported incidents are minor in nature. There have been some problems with vandalism to signs and benches along the trail and these we were able to attribute to juveniles that were causing those problems. There were several reports of bicycles being stolen but for the number of people that utilize the trail the numbers are insignificant.

We have found that the trail brings in so many people that it has actually lead to a decrease in problems we formally encountered ,such as underage drinking along the river banks. The increased presence of people on the trail has contributed to this problem being reduced.

The trail has also spawned new businesses along the trail. We now have several bike sales and repair shops, new restaurants, convenience stores, and ice cream stands that have been opened .

The trail brings in thousands of users each year and has lead to several organized rides by various organizations such as the Girl Scouts of America and by the local Council of Governments.

The Elizabeth Township Police have started a patrol plan for the trail that is Community Oriented Policing based. Officers spend time on the trail meeting and assisting trail users. We have found this leads to good community relations . Officers actually look forward to their tour of duty on the trail.

Based on our experience with the trail we se no reason for any municipality to fear having a trail established. The Yough River Trail is a success that can only lead to better things for our community.

Very truly yours,

Charles R. Tennant
Chief of Police

OFFICE OF
DODGE COUNTY SHERIFF

STEPHEN G. FITZGERALD
Sheriff

JEROLD L. WITTE
Chief Deputy

May 19, 1997

Mr. Hugh Morris
Research Coordinator
1100 Seventeenth Street, NW
10th Floor
Washington, DC 20036

Dear Mr. Morris:

This letter is in response to your request for information on the impact of the Wild Goose State Trail and the crime/complaint rate. Please be advised the Trail has had virtually no impact on the crime rate in Dodge County.

Sincerely,

Jerry Witte,
Chief Deputy

JW:dd

141 North Main Street • Juneau, WI 53039-1072 • Phone (414)386-3726 • FAX (414)386-3742

CITY OF
LOUISVILLE
CONSTITUTION TOWN

DEPARTMENT OF SAFETY
DIVISION OF POLICE 330/875-1607

May 13, 1997

Hugh Morris
Rails to Trails Conservancy
1100 Seventeenth St. NW
Washington, DC 20036

Dear Mr. Morris,

I came to Louisville in August of 1991 as the Chief of Police. At that time, the City was completing plans for the conversion of an old railway line to a walking path. I was concerned for the safety of citizens due, in part, to the remote area that was traversed by the line. I strongly encouraged the placement of emergency call boxes along the walkway. The call boxes were never installed.

I am very pleased to report that crime incidents along the walkway are almost nonexistent. I attribute this to several factors. Primarily, the high volume of use by families along this walking path has created a community ownership of the path. Police also regularly patrol the area, but it is unlikely that anyone will travel the path for more than a quarter of a mile without coming into contact with other path users.

The incidents of vandalism over five years has been only two small areas of the asphalt that were spray painted. Those were immediately cleaned up by city crews. It should be noted that the path is also along an area that is a frequent loitering place for juveniles that have little supervision. Still, the criminal complaints along the path are almost zero.

Two weeks ago, my family and I took part in a community clean-up day. My wife, one daughter, and I elected to walk the path to pick up litter. Each of us armed with a large trash bag and work gloves, we started out. By the end of the mile and a half, we had found ONE piece of litter almost too small to have noticed. We did encounter, however, several familes walking and a police patrol car. I can only attribute the cleanliness to the ownership that citizens have taken for this area. I should also note that once you leave the path and continue where the railway line had been, the trash and graffiti are overwhelming.

I hope that you will find this information useful. If I can be of further assistance, please do not hesitate to call upon me.

Sincerely,

Ross L. Riggs
Chief of Police

215 South Mill Street • Louisville, Ohio 44641 • Fax 330/875-1820

"Service to OUR Communities"

TWIN CITIES
Police Authority

250 Doherty Drive, Larkspur, CA 94939

CORTE MADERA / LARKSPUR Phone: (415) 927-5150 Fax: (415) 927-5167

PHILLIP D. GREEN
Chief of Police

May 13, 1997

Mr. Hugh Morris
Research Coordinator
1100 Seventeenth Street, NW
10th Floor
Washington, DC 20036

Re: Railroad Corridors

Dear Mr. Morris:

In your letter to Chief Phil Green dated May 1, 1997, you requested information regarding our calls for service and type of crimes occurring in and around trails and adjacent properties.

I don't have specific numbers for you, however, I can state that a majority of calls we receive about incidents occurring along bike paths, railroad right-of-ways, walking trails and fire trails are usually about transient types living and or sleeping in bushes inside makeshift shelters. Occasionally, residents will report youth gatherings or suspicious subjects loitering and or drinking in a certain area.

We had a continual problem and received many complaints about an abandoned train station where transients would seek shelter. They would build fires causing concern from local residents that accidental fires may start and travel onto the hillsides. This building would also entice children and other individuals who occupied the building for fun and games. However, since the entrance and windows have been bordered up and secured by a surrounding fence, we have had no problems.

Our crime experience along these trails are isolated. We have not experienced an increase in crime since the trail was developed. However, the potential for criminal acts are always present because these trails are remote areas, dense with shrubs and bushes, isolated from the general public and not heavily travelled.

We believe the development of the trail was a good idea. We do not feel that the trail encourages more crime than existed before the trail went in.

I hope I have addressed all your questions. Please don't hesitate to contact me should you need additional information.

Sincerely yours,

Andre Horn

Andre Horn
Captain

City of Johnstown, Pennsylvania
Police Department

Public Safety Building
401 Washington Street
Johnstown, PA 15901
814-533-2075
814-533-2076 (FAX)

Robert H. Huntley
Chief of Police

May 5, 1997

Hugh Morris
Research Coordinator
Rails to Trails
1100 Seventeenth St NW
10th Floor
Washington, DC 20036

Dear Mr. Morris,

I am writing in response to your request for crime information on the Jim Mayer Riverwalk.

This is somewhat an unusual situation. Because there was no use for the area before it became a trail, there were no reported incidents of crime. There was no use by the public and no property to have crimes committed against. Since it has become a trail, there is basically still no property there, except as you noted, signs, etc. And we have had no incidents of crimes being committed against users of the trail. We have had incidents of underage drinking and some drug abuse occur on the trail. But, these incidents are extremely rare and are not creating a problem/concern.

A check of our records does not indicate any reports of crimes against users or property in the vicinity.

Since the trail has been there, the only comments we have heard have been all positive. From our prospective, the trail has been an asset to the community.

If I can be of an further assistance, please contact my office.

Very truly yours,

Robert H. Huntley
Chief of Police

OFFICE OF THE SHERIFF

515 W. Moreland Blvd
Box 1488
Waukesha, WI 53187

Waukesha County Huber
1400 Northview Road
Waukesha, WI 53188

WILLIAM KRUZIKI, *Sheriff*

May 14, 1997

Mr. Hugh Morris
Research Coordinator
Rails to Trails Conservancy
1100 17th St. NW
Washington, D.C. 20036

Dear Mr. Morris:

I have reviewed your inquiry relative to incidents of crime along and adjacent to the Glacial Drumlin State Park Trail. Regrettably, I must inform you that we do not record incident information in a manner that would allow us to extract specific data for incidents of crime for the location in question.

However, I can tell you that based upon our general experience, since the creation of the trail, that we have not experienced any significant problems that would infer that the bicycle trail is either a direct or indirect contributor to crime. To the best of my knowledge, the trail has not resulted in a significant increase in calls for service.

Although I can not support it with specific data, my impression is that the bicycle trail may be of benefit to law enforcement as the use of the trail by our community residents places them in areas that typically were not immediately accessible by law enforcement officers. Subsequently community residents are in the position of reporting incidents to us that may have otherwise remain unreported.

For your information, as a part of our rural community policing initiative, we are introducing bicycle patrol service not only on the trail but in our county parks as well. Our intent is to increase our police presence in these areas as well as attempt to enlist the support of users in reporting crime.

Should you require any additional information, please do not hesitate to contact me at (414) 548-7126. Thank you.

Sincerely,

Waukesha County Sheriff's Department

William Kruziki, Sheriff

Gary R. Paluszcyk, Inspector

Administration: 548-7126 Records: 548-7156 Process: 548-7151 Jail: 548-7170 Huber: 548-7151 Fax No: 548-7857

South Burlington Police Department
575 Dorset Street
South Burlington, Vermont 05403
Brian R. Searles, Chief

Emergency 658-0150
Administration 658-7971
Detectives 658-7969

DARE
TO KEEP KIDS OFF DRUGS

July 23, 1991

Herb Durfee, Staff Planner
Chittenden County Regional Planning Commission
P. O. Box 108
Essex Junction, VT 05452

Dear Mr. Durfee:

In preparation for the July 15, 1991 South Burlington City Council meeting, which included a discussion and vote on Phase II of the Recreation Path, I looked at some data and made inquiries of the police in Burlington and Stowe about their experience with their bike paths. A summary of what I found is listed below:

Burlington -

1. According to official records of the Burlington Police Department there were 71 police responses to the Burlington Bike Path during the 27 months ending June 30, 1991. Adjusting those numbers for winter months (removing the 10 months when there were no complaints) the average for the 17 remaining months is 4.2 responses per month, compared to a citywide mean of over 3,200 per month. The bike path in Burlington, therefore, is the scene of .0013% of all calls over the last two years, making it one of the safest places in Burlington, according to Chief Kevin Scully.

2. The 71 complaints themselves need further analysis. Some of these appear not to be related to the bike path. I looked at two specific categories.

   First, one title of complaint listed by the computer in Burlington is "Discharging Firearms or Fireworks Unlawfully". One South Burlington Bike Path opponent shortened the category title to

"Discharging Firearms" for the purposes of a letter to the City Council. In fact, that complaint was a report of a loud noise from a resident near the bike path and the investigation concluded that kids had set off a firecracker at a nearby beach.

Second, there are fourteen responses to reports of inappropriate conduct. These are entitled "Disorderly Conduct", "Drunkenness", "Public Complaints", "Noise", etc., and seem to have alcohol or other drugs as a common theme. A cursory look at those cases reveals a strong likelihood that they are related to special events (concerts, festivals, etc.) held adjacent to the path on beaches and in parks.

3. I reviewed the patrol strategy of the Burlington Police Department and found that most of the patrol is done on bikes by non-police personnel who work in a summer program that existed before the path and is not an expensive proposition. These patrols are primarily a communication link to regular officers who also occasionally do bike patrol themselves.

The Burlington Police Department is fully supportive of the path and I have attached a letter I received from them attesting to the minor nature of crime problems.

Stowe - STOWE RECREATION PATH

1. The Stowe Path has been in operation for more than four years and during that time only 44 complaints, 25 of which have been larcenies from vehicles, have been reported. This is an amazingly low number for such a popular path, but the number of larcenies caused me to look a little closer. I visited the path a couple of days before our meeting and learned that the thefts occurred in a couple of fairly remote parking lots just off the path. The police explained that groups of thieves have been victimizing tourists' cars in parking lots for many years. It happens primarily at ski areas and local

restaurants and motels, but the thefts in the lots near the path are just an extension of that activity. I think that this phenomenon is not important to Chittenden County paths as they will generally be used by residents and not tourists. There is no evidence of a significant problem like this in Burlington.

2. The other numbers are so low that they need not be analyzed but I did look at one entitled "Untimely Death" and learned that a gentlemen did suffer a heart attack while using the Stowe path.

3. The Stowe Police do no routine patrolling of the Stowe Bike Path. The police department says that the path has made Stowe safer as pedestrians and cyclists do not have to be on Route 108 with the heavy traffic.

People from South Burlington have called me and expressed concerns and many of them have mentioned the potential for the crime of rape to occur on the proposed bikeway.

I looked specifically for reports of rape or sexual assault on the paths in Stowe and Burlington and was relieved to learn that there have been no reports in either place.

There has been no increase in crime in Burlington or Stowe which is attributable to the bike paths.

My position is that bike paths proposed for Chittenden County communities provide a healthy way of linking neighborhoods and are likely to have a positive affect on the overall safety of the public.

Crime and the fear of crime do not flourish in an environment of high energy and healthy interaction among law abiding community members. Thus, the quality of life is enhanced in several ways including an enhancement of individual physical fitness, a safer mode of transportation

for cyclists and pedestrians and the potential for less crime overall in the communities.

In terms of public safety a system of bike paths for the county is a great idea.

Sincerely,

Brian R. Searles
Chief of Police

BRS:mc4

CITY OF BLOOMINGTON

Timothy M. Linskey, Chief of Police
Richard A. Ryan, Assistant Chief
Dennis O'Brien, Captain

May 8, 1997

Mr. Hugh Morris
Research Coordinator
Rails to Trails Conservancy
1100 Seventeenth Street, NW, 10th Floor
Washington, DC 20036

Dear Mr. Morris:

I am writing in response to your letter of May 1, 1997 and your questions regarding local law enforcement involvement in vacated rail lines being used for bike, hiking and walking trails.

As you are well aware, Bloomington and its sister city have a well-constructed trail called Constitution Trail. It runs through both business, residential and rural areas. It is highly used by a cross section of the populace of both cities for bike riding, roller blading, running, and walking.

This trail is not visible from city streets for over half of the layout, and much of it cannot be patrolled by an officer using conventional methods. However, we do periodically put our Bike Patrol officers on Constitution Trail. This is done primarily as a public relations maneuver, because there is very little crime created on or near the trail due to its construction.

Our citizens use this trail twenty-four hours a day and have met with very little crime on this trail. We have seen some of the neighboring residents have improved the development of their properties adjacent to the trail.

When the trail was first constructed, the administration of this department had a concern the trail would invite crime and would add to the crime rate of this city. However, in fact, it has had no impact on the crime rate.

PROGRESS THROUGH PROFESSIONALISM

The development of Constitution Trail was an outstanding idea supported by the both the City of Bloomington and Town of Normal. There have been minimal negative remarks regarding the development of this trail. There are plans for future development.

Constitution Trail can be considered a resource which is enjoyed by the populace of both Bloomington and Normal.

Sincerely,

Timothy M. Linskey
Chief of Police

TML:mjm

CITY OF BAY CITY
POLICE DEPARTMENT

Gary G. Hect, Deputy Chief
Bay City Police Department
501 Third St.
Bay City, MI 48708

May 12, 1997

Rails to Trails Conservancy
1100 Seventeenth Street, NW
10th Floor
Washington, DC 20036

Dear Sir/Madam:

This is in regards to your request for information on our Bay Hampton Rail-Trail.

Upon checking our criminal file we could only find one complaint associated with the Rail Trail. The complaint is listed as an "assault and attempted larceny," see attached C#97-02216.

Due to the limitations on our complaint tracking system any complaints generated adjacent to the Rail Trail would be extremely difficult to identify. But as a frequent walker of the Rail Trail I can provide some personal observations. I have observed some minor graffiti on the park benches and the Rail Trail walkway. There is the occasional broken bottle on the walkway. I have not observed any peripheral damage to adjacent property. Criminal activity on the Rail Trail is extremely minor and infrequent.

If I can be of any further assistance please feel free to contact me.

Sincerely,

Gary G. Hect, Deputy Chief
Support Services Division

MIDLAND COUNTY
OFFICE OF THE SHERIFF

JOHN S. REDER, SHERIFF
2727 RODD STREET • MIDLAND, MICHIGAN 48640 • TELEPHONE (517) 839-4600
FAX (517) 631-9478

May 8, 1997

Rails to Trails Conservancy
1100 Seventeenth Street, NW
10th Floor
Washington, DC 20036

Dear Mr. Morris:

I am responding to your letter of May 1, 1997.

When the Rails to Trails project was first being developed in Midland County, the concerns you described were brought up here also.

Happily, I can report to you that we have no major problems on our Rail Trails. The development of this park has been a very positive experience for the entire community. The park receives a lot of use from the public.

The incidents that we have had are for the most part misuse of the Trail. Items such as a go-cart or motorcycle being driven on the Trail.

In 1995, the Midland Sheriff's Office responded to eight calls on the Rail Trail. None of these responses required a formal report. In 1996, the Sheriff's Office responded to eight calls, one of which required a ticket for minor in possession of tobacco products. In 1997 through the first of May, we have had no calls for service on the Rail Trail.

In conclusion, I would say that crime has NOT been a factor on or near the Rail Trail. The development of this park has been a very positive experience for Midland County and its residents.

I hope this letter meets your needs, and please do not hesitate to contact me if I can be of further assistance.

Sincerely,

John S. Reder

JSR/sb

OFFICE OF THE SHERIFF

Patrick J. Conlin, Sheriff
J. Michael Welsh, Chief Deputy

May 3, 1997

Mr. Hugh Morris
Research Coordinator
1100 Seventh Street, NW
10th Floor
Washington, DC 20036

Dear Mr. Morris:

I received your letter today inquiring about the Sugar River State Park Trail which is in Green County, Wisconsin. I am pleased to say that there is almost no crime associated with our trail and it is a very popular tourist attraction. It is one of our most positive advertised attractions which covers many municipalities.

The trail does not encourage crime, and in fact, probably deters crime since there are many people, tourists and local citizens using the trail for many activities at various hours of the day. The development of the trail was such a good idea, the County has just recently acquired another trail in addition to our other existing trail, the Cheese Country Recreational Trail. I have enclosed information for our ordinances concerning the Cheese Country Recreational Trail along with a brochure and other correspondence. Sorry to say, I do not have any information on the State Trail at hand. If you want, I can acquire some and forward. I usually have some, but must have recently ran out.

If you need anything, please feel free to contact me.

Sincerely,

Pat Conlin

Pat Conlin
Sheriff

tmf wpd

2827 6th Street • P.O. Box 473 • Monroe, WI 53566 • 608-328-9400 • Fax 608-328-1823

Rails-to-Trails Conservancy
1100 Seventeenth Street, NW
Washington, DC. 20036
Tel: 202-331-9696 • Fax: 202-331-9680
Web site: www.railstotrails.org

With field offices in California, Florida, Illinois, Michigan, Ohio and Pennsylvania

National Park Service
Rivers, Trails, and Conservation Assistance Program
1849 C Street, NW, Room 3606
Washington, DC. 20240-0001
Tel: 202-565-1200 • Fax: 202-565-1204
Web site: www.cr.nps.gov/rtca/rtc/rtcahome.html

Complete George

2015/10 – Effect of Greenways on Property Values

Linking bike paths' proximity to appreciation of real estate values and tax revenue

Studies have shown that real estate property values increase with proximity to bicycle paths. People enjoy living close to bike paths and are willing to pay more for an otherwise comparable house to be closer to one. For example, the Monon Trail in Indianapolis, IN.

Given two identical houses, with the same number of square feet, bathrooms, bedrooms, and comparable garages-porches – one within a half mile of the Monon Trail and another further away – the home closer to the Trail would sell for an average of 11 percent more.

Economic Benefits of Bicycle Infrastructure Investments – League of American Bicyclists

The LA Times Business Section published an article this weekend that shows that the value of bicycle paths is not lost on those covering real estate. In an article with the helpful headline "On the Market: Homes Near Bike Paths," they feature six properties for sale located near close to bicycle facilities. A brief description next to each photo mentions which bicycle path or trails is nearby the property. The values range from just over $300,000 to 1.3 million, which in California, qualifies as something for everyone.

On the Market, Homes near Bike Paths – Los Angeles Times

As we reported last month, paint and asphalt crews have been hard at work finishing new two-way lanes on the 10th Street corridor. The new dedicated biking lanes are only the first phase of a 26-item project list approved by the City of Atlanta, expanding bike infrastructure from Monroe Drive and ... eventually running along Peachtree Street.

But it's hard to hear the implications for homeowners and house-hunters — either positive or negative — over the public's overwhelmingly triumphant bells and whistles. When bike-friendly infrastructure breaks ground, how can we expect property values to respond? As it turns out, experts say sellers and buyers would be wise to welcome bike lanes.

Bike Lanes & Property Values: Is There A Correlation? – Atlanta Curbed

On April Fool's Day, Fairfax Media posted a video affirming that the new Sydney cycleways have had a positive effect on property prices. It was no joke. It seems that having a bikeway right outside your front door is good for your health and the value of your house.

Bike paths were placed a shocking third on a list of 39 features that homebuyers defined as crucial in buying homes in a new community.

Vancouver saw a similar effect in 2010 with 65 percent of realtors using new bikeways as a selling feature on a home.

Pittsburgh, whose bike lanes were added in 2007, found those lanes not only influenced residential real estate activity, but ignited commercial and business activity as well.

In North Carolina, realtors found that 40 homes adjacent to the Shepherd's Vineway Bikeway saw property increases of $5,000 and up.

How Bike Lanes can Boost the Economy – This Big City, Vancouver

There has not been research into whether Hubway in particular boosts or deflates property values in Boston (and research into other bike-sharing programs tends to focus on more general economic impacts, like commuting times and area bike sales). But there has been research on the effects on property of bike paths/lanes, a cousin to bike-sharing programs. Basically, the verdict is that they can only help the value of adjacent or nearby property.

In 2002, the National Associations of Realtors and Home Builders surveyed 2,000 homebuyers and found that a path for biking, walking or jogging was 'the second most important neighborhood amenity, behind only highway access.'

Bikes, Bike Paths, and Home Values – Boston Magazine

New research suggests that "Complete Streets" — those carefully designed, multi-modal travel corridors that often include, yes, bike lanes — can yield handsome returns on investment for cities. Like millions, sometimes realized in no more than a year, because shared streets reduce collisions, which in turn saves money on medical costs and property damage. And there's more. These street

alterations are also correlated with increased property values and even higher employment numbers.

How Bike Lanes & Shared Streets Pay for Themselves, and then Some – Philadelphia Mag

If you are a homeowner lucky enough to have a property with a bike lane nearby, you are probably going to see a sharp hike in the asking price for your home. However, now that you know the benefits of the bike lane, the real question is whether you will want to sell your home after all!

Why Bike Lanes Make Your Property Prices Skyrocket – icebike.org

"The Port Authority should also explore the use of TIF to finance essential infrastructure projects. TIF is an increasingly common innovative financing mechanism used principally in redevelopment or improvement projects, particularly around mass transit. TIF allows local governments to direct a portion of identified incremental tax revenue toward improvements in a specially established district, often for the purpose of eliminating blight, providing economic development benefit, or expanding modal alternatives or capacity. Taxes on the increases of property values yield revenue that is pledged to support a specific project or projects. TIF could present the Port Authority with another financing tool that could spur otherwise stalled or unrealized projects that are unfunded or underfunded."

Keeping the Region Moving – PANYNJ

"Home values within one-third of a mile of the park increased 10% immediately following its opening. This was not simply an overall increase in valuation of parks, or of real estate near the west side of Manhattan, but was directly due to the new public good, the park, itself. The increases in home valuations led to property taxes collected by the city in 2010 alone to nearly surpass the cost of constructing the park itself."

The High Line Park and Timing of Capitalization of Public Goods – Michael Levere

Neile Weissman, 2015

Project Report for

Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas

prepared for

Delaware Center For Transportation

and

The State of Delaware Department of Transportation

by

David P. Racca and Amardeep Dhanju

Center for Applied Demography & Survey Research

College of Human Services, Education, and Public Policy
University of Delaware
Newark, DE 19716

November 2006

Introduction

Studies and surveys in other parts of the country have shown that bicycle paths (trails, greenways) can contribute to areas where they are established by providing recreation, transportation, a sense of community, increased property values, and lower crime. On the other hand, in some cases with many new initiatives for the creation of walking and biking paths there is resistance by members of the community who worry that property values may be negatively impacted, that there will be loss of privacy, and the potential for more crime in their neighborhood. Success of bike and walking trail projects depends often on planners understanding and communicating what is known about the impacts of bike and walk ways in a community.

This project examined the literature and presents what is known concerning the impacts on property values with the introduction of bicycle paths and also presents some information about crime in relation to bicycle and pedestrian paths. In addition a statistical model was developed in this project using Delaware property data to examine the impact of bicycle paths on nearby housing.

In addition to being used by bicycles, "bike paths" are typically designated for use also by pedestrians, skaters, and other non-motorized uses and are typically referred to as paths, trails, or greenways. Bike lanes addressed in this project were for the most part, dedicated paths rather than portions of the public roadway simply striped or designated as a suggested bike way due to extra road width or shoulders. There is no information to suggest that a bike path designated as such by only the presence of a shoulder in the road would impact property values in Delaware as they are for the most part indistinguishable from the road corridor itself and are more a feature of the existing road rather than the neighboring properties.

Part One, Studies Addressing Impacts of Bike Paths

Some bike path initiatives around the country to create bicycle or pedestrian paths have been encouraged and facilitated by the local communities, while in other communities, such facilities have encountered resistance where residents fear that the introduction of a path or trail will lead to decrease in property values and/or increase in crime that would adversely effect the quality of life. Some property owners bordering proposed bike paths or greenways have shown opposition to trails in "their back yards". There is a large debate as to whether pedestrian and bicycle trails effect property values and negatively impact the quality of life. Increasingly, projects such as "Rails to Trails" program, greenways initiatives, and a variety of bike path projects, site the need to address the economic impact question in order to gain crucial public support for their projects. A literature review was undertaken for this project to identify previous studies on the issue.

In the last two decades a number of studies covering a wide spectrum of bike path related issues at local, regional and national levels have been conducted. Federal Highway Administration (FHA) on the national level and various departments of transportation at state level are the major funding agencies for such studies. The following portion of this section explores studies related to the economic impacts of bike paths on property values.

Colorodo Study

One of the most often referenced studies is "The Effect of Greenways on Property Values and Public Safety"* in Colorado. It involves a survey of residents adjacent to a variety of trails in Metro-Denver. This study found that the effect of the trails on neighboring property was beneficial rather than detrimental. For residents of single family homes adjacent to the trail, 29% of residents believed that location of the trail would increase the selling price of their homes. 7% of the residents felt that the trail would make the home easier to sell, 29% were positively influenced by the trail in their decision to buy their

* "The Effect of Greenways On Property Values and Public Safety", A Joint Study by : The Conservation Fund and Colorado State Parks State Trails Program, Colorado State Parks, State Trails Program, Sydney Shafroth Macy, Stuart H. Macdonald, March 1995.

home. For residents of town homes, apartments, and condominiums adjacent to the trail, 42% felt it would increase the selling price of their home and 17% were influenced by the trail to move to the area. No public safety issues could be directly linked to the trail. Police interviewed as part of the study doubted there was a concern for public safety during day light hours due to the constant passage of people on or around the trails.

Burke-Gilman Trail Study

Another study examining a trail's effect on property values is outlined in evaluation of the Burke-Gilman trail's effect On Property Values and Crime** in Seattle metropolitan area. The Burke-Gilman trail is an 8 to 10 foot wide, 12.1 mile, multipurpose trail that follows an abandoned railroad right of way and passes through residential neighborhoods. Data was collected via telephone by interviewing, residents near and adjacent to the trail, real estate agents who buy and sell homes near the trail, and police officers who patrol neighborhoods adjacent to the trail. According to real estate agents, property near but not immediately adjacent to the trail is significantly easier to sell, and on average sells for six percent or more. Property immediately adjacent to the trail, however, is only slightly easier to sell. Almost two thirds of the residents felt the trail increased the quality of life in the neighborhood and there is a very high level of public acceptance and support for the trail. The study concluded that concerns about decreased property values, increased crime, and a lower quality of life due to the trails was unfounded, and in fact the opposite was true, that multi-use trails are an amenity that help sell homes, increase property values and improve the quality of life.

The National Association of Reversionary Property Owners (NARPO)

The National Association of Reversionary Property Owners (NARPO) is "a group of property owners who have joined together to educate all landowners in the United States about the true ownership of railroad, utility, road and other governmental types of Rights-Of-Way (ROW)." (http://home.earthlink.net/~dick156/row.htm) The group argues that groups, in particular rail-to-trail groups, are unconstitutionally taking abutting property

** "Evaluation Of The Burke-Gilman Trail's Effect on Property Values and Crime" , Seattle Engineering Department and Office of Planning, Gary Zarker, james M. Bourey, May 1987

Conclusion

This project performed a literature review of past information and studies concerning property values related to the presence of bicycle and pedestrian paths. In addition Delaware property values were examined to determine how the presence of a bicycle path may affect property values.

Bike facilities are typically also for pedestrians, skaters, and other non-motorized uses and are typically referred to as paths, trails, or greenways. Bike lanes addressed in this project were for the most part, dedicated paths rather than portions of the public roadway simply striped or designated as a suggested bike way due to extra road width or shoulders.

The majority of studies examined indicate that the presence of a bike path/trail either increases property values and ease of sale slightly or has no effect. Studies have shown that neighbors of many bike paths/trails feel that the quality of life of their neighborhood has been improved, that the trails were a good use of open space, and in the case of abandoned railways were an improvement from before the trails went in. There is definitely a large portion of the population that sees bike paths as an amenity and will seek out residences near trails, parks, and other natural resource areas. Some studies express that those recently moving into areas near bike paths are generally more favorable to them than those who have lived in neighborhoods before the construction of a trail. In some areas a large majority of neighbors are very happy with the trails, even some who were originally opposed to their construction. Whether or not a bike path is generally beneficial for a locale depends on a number of factors.

Opponents to bike path and trail projects often say that property values will be adversely affected but there is not much evidence of this. The National Parks Service hits the mark when they say, "Increases in nearby property values depend upon the ability of developers, planners and greenway proponents to successfully integrate neighborhood development and open space. Designing greenways to minimize potential homeowner-park user conflicts can help avoid a decrease in property values of immediately adjacent

properties." There are numerous examples in the literature that indicate overall success depending on attention to design and maintenance and addressing issues and problems with property owners promptly.

A model developed in this project that examined factors affecting property values in Delaware and the effects of proximity to a bike path show that a bicycle path would be expected to slightly increase property values by about $8,800.

Related to property values is crime, and information about crime near or on bike paths is referenced in this report. Crime happens in most types of land use (e.g. parking lots, college campus, abandoned railway, street corner, stores, wooded areas, industrial parks, private homes etc) and with any recreational facility the level of crime typically is correlated with the level of crime in the surrounding area and the design of the facility. A well-managed recreation facility is more likely to be a better neighboring land use than an abandoned property. This study concludes that crime on bike paths is minimal and must be considered in perspective with risks associated with other activities. The way to minimize crime on trails is to ensure that users exercise proper safety precautions, keep the trail well maintained, and boost trail use.

City of Loveland

November 17, 2022

William Brown, Mayor
Village of Mariemont
Mariemont, Ohio

Dear Mayor Brown:

Don Mills ask that I try to summarize a few of the many benefits that the Little Miami Scenic Bike Trail, which traverses through our downtown business district, provides to the City of Loveland.

The portion of the Little Miami Scenic Bike Trail that runs through downtown Loveland, is one of the more popular of the trail, per counts conducted by the Friends of the Little Miami State Park (FLSMP). Given the over 260,000 annual users of the bike trail (per FLSMP 2020 count), it is obvious when visiting our downtown district, that many of our businesses both retail and restaurants utilize the trail for direct pedestrian access into their establishment. Many amenities have been added along the trail such as bike racks, garbage/ recycling receptacles and park benches to welcome bike trail users.

The benefits of the bike trail go beyond its impact on our commercial establishments. In addition to Loveland Station, a downtown mixed used development which includes 94 residential units, the city is observing other high quality residential development within walking distance of the downtown district. Even outside of the area immediately adjacent to the downtown district, city staff feels confident that the bike trail is a factor in choosing to move to the City of Loveland.

Other important factors when discussing the impact of a bike trail from a municipal standpoint, is that we have never observed an uptick in crime associated with the use of the bike trail, even after the creation of the Designated Outdoor Refreshment Area (DORA). Also, we have found that the users of the trail are respectful of our downtown district and the adjacent Nisbet Park, that they are appreciative of the amenities installed along the trail, and more often than not, choose to patronize our local businesses.

Quite simply the location of the Little Miami Scenic Bike Trail has been an important factor in the steady development we are observing throughout our city limits and within our neighboring communities. I would be more than happy to discuss this matter further.

Sincerely

David Kennedy
City Manager