Are Green Lots Worth More Than Brown Lots? An Economic Incentive for Erosion Control on Residential Developments[1]

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Abstract

Construction sites are major contributors to nonpoint source (NPS) pollution. However, a lack of personnel to enforce erosion control regulations and limited voluntary compliance means that few developers apply effective erosion control. New approaches are needed to increase erosion control on construction sites if this source of NPS pollution is to be significantly reduced. We have tested whether an economic advantage exists for developers who use vegetative cover for erosion control, independent of advantages gained in addressing environmental or regulatory concerns. Improving residential lot appearance from muddy brown to green grass may increase the appeal of the lot to buyers. A market survey shows that homebuyers and Realtors perceive vegetated lots to be worth more than unvegetated lots, and this increased value exceeds the cost of seeding. Thus, developers can now be encouraged to invest in vegetative cover because of the potentially high return on the investment.

Introduction

Sediment Pollution and Construction Sites

Nonpoint source (NPS) pollution, produced from diffuse sources such as runoff from agricultural land, construction sites, and urban surfaces, is now the leading cause of surface waterqualitydegradation in the United States (Novotny and Chesters, 1989; Federal Register, 1990). In developing areas, construction sites are a major source of NPS pollution because soil erosion rates are increased dramatically when land is exposed and disturbed by excavation and vehicular movement (Harbor et al., 1995; Goudie, 1994; Goldman et al., 1986, Fennessey and Jarrett, 1994). In fact, some of the greatest soil erosion rates ever reported are associated with construction activities (Crawford and Lenat, 1989); erosion rates on construction sites are typically 2-40,000 times greater than rates under preconstruction conditions (Wolman and Schick, 1967; Harbor, in press). Sediment contributed to streams by construction sites can exceed that previously

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deposited over many decades under pre-development land uses, radically altering stream geomorphology and ecology (e.g., Wolman and Schick, 1967). The larger-than-normal sediment deposition in waterways frequently exceeds the natural capacity of the receiving water system to assimilate and equilibrate to the sediment influx (Paterson et al., 1993), causing rapid channel changes and increased probability of flooding, erosion, and sedimentation problems (Goldman et al., 1986).

In addition to sediment, construction sites generate other pollutants such as pesticides, nitrogen, and phosphorus from fertilizers, petroleum products such as oil and gas from machinery, soil stabilizers, construction chemicals, and washings from concrete or bituminous mixing and flushing operations (Koehn and Rispoli, 1982; Lemly, 1982). In some cases these pollutants are in particulate form or are adsorbed by soil particles and are transported with the suspended sediment in runoff from construction sites (Paterson et al., 1993; Bhaduri et al., 1997).

Although construction sites generate a wide range of potential pollutants, sediment overshadows all the other construction site pollutants in total ecological and economic impact on receiving waters (Lemly, 1982). It was estimated that 15 million tons of sediment were released from urban construction sites to surface waters in or near heavily populated areas in 1975 (Lemly, 1982). The North Carolina Department of Natural Resources and Community Development has stated, that "sediment and its effects on stream environments" is the "most widespread water quality problem in North Carolina" (Crawford and Lenat, 1989). Because construction activities predominantly occur near existing population centers, the waters that are most seriously degraded are generally those that are most frequently used (Lemly, 1982).

Economic Consequences of Sedimentation

In addition to environmental impacts, enhanced delivery of sediment to off-site areas from construction activities has significant economic effects (Table 1). These economic impacts result from lakes and streams becoming turbid and filling with silt, destruction of commercial aquatic species, the need for additional treatment of turbid water for industrial use, filling of harbors and navigation channels, loss of storage capacity of reservoirs, damage to drainage ditches, increased frequency of flooding, loss of aesthetic value in the environment, and loss of game habitat (Lemly, 1982; Wolman and Schick, 1967; Koehn and Rispoli, 1982). The economic burden of mitigating these environmental impacts is almost always placed upon the taxpayer, rather than on the operator of the construction site that is producing high sediment yields (Harbor, in press). By not paying to prevent the off-site transport of sediment through the use of erosion control measures, the developer allows sediment from the construction site to reach waterways where the economic and environmental costs of any impacts are paid by downstream landowners and the community as a whole, and not the developer.

Overall, annual expenditures for in-stream and off-stream impacts due to sedimentation in the United States exceeds \$11.6 billion (Table 1). In-stream effects include impacts while sediment is in a waterway (stream, river, lake, or reservoir). Off-stream effects can occur before or after sediment reaches a waterway, either in floodwater or in water withdrawn from waterways to be used for industries, municipalities, or agriculture (Clark, 1985; Clark et al., 1985; Paterson et al., 1993). Although agricultural areas are far more extensive than construction sites, the mass of sediment per unit volume of runoff from urban and construction areas is 5 to 20 times greater than that of runoff from agricultural lands (Fennessey and Jarrett, 1994). In addition, construction sites are usually located in developing or developed areas, where potential impacts on infrastructure and other water uses are more severe than in rural areas. Estimates of agriculture's contribution to off-site effects range from 1/3 to 2/3 of the total (Clark, 1985; Clark et al., 1985; Colacicco et al., 1989, Pimentel, et al. 1995). Thus, urban off-site environmental impacts are probably on the order of \$3.9 to \$7.8 billion per year (1/3 to 2/3 of the total off-site effects), and are often borne by off-site landowners and communities. One of the main goals of erosion and sediment control regulations is to avoid these costs. The problem, however, is that developers have to pay to reduce erosion yet do not see any immediate return on this investment. Because there is little economic incentive for developers to control erosion, regulatory and educational approaches have been developed to improve construction site erosion control, and requests to impose impact fees on developers have increased (Trotti, 1997).

Table 1. Off-site damage costs from soil erosion by water in the United States

Type of Damage	Cost (millions in 1997 dollars*)
In-stream damage	
Recreational (fishing, boating, swimming)	3,886.0
Water storage facilities (dredging, excavation, construction of sediment pools)	1,340.7
Navigation (accidents, dredging)	1,088.1
Other in-stream uses (commercial fisheries)	1,748.7
Subtotal in-stream	8,063.5
Off-stream effects	
Flood damages (sediment damage to urban and agricultural areas)	1,496.1
Water conveyance facilities (sediment removal of drainage ditches and irrigation canals)	388.6
Water treatment facilities	194.3
Other-off stream uses (municipal and industrial, steam electric power plants, irrigation)	1,554.4
Subtotal off-stream	3,633.4
Total water erosion costs	11,696.9+

(Data based on: Clark et al., 1985)
*Conversion using Consumer Price Index from 1980-1997.
+ Assuming that effects are the same today as in 1980.

Vegetation and erosion control

The significant ecological and economic impacts of sedimentation provide strong motivation for erosion control. Soil erosion involves the detachment of soil particles by raindrop impact, wind-blown particle impact, wetting and drying cycles, freezing and thawing, and runoff, and the transport of detached soil particles by rain splash, wind and runoff

(Ekwue, 1990; Goldman et al., 1986). Climate, topography, vegetative cover, and soil characteristics are the principal factors that control soil erosion potential. Climate and soil characteristics cannot be readily controlled on a site, and topography is constrained by pre-existing conditions and the grading plan, leaving surface cover as the most easily modified variable that controls oil erosion on a site. Increasing vegetative cover on barren areas such as construction sites is an excellent way to impede soil erosion and decrease sedimentation (Fig. 1).

"Vegetative cover is the most effective form of erosion control... a properly revegetated soil will be protected from erosion indefinitely without any need for human attention" (Goldman et al., 1986, p. 6.23). Vegetation (especially close to the ground surface) protects the surface from raindrop impact and reduces the velocity of water flowing over the surface by increasing surface roughness and disrupting overland flow (Clark et al., 1985; Rogers and Schumm, 1991; Satterlund, 1972). The reduction of water velocity flowing over the surface and the breaking up of soil by plant roots increases the amount of infiltration, thereby reducing the amount of surface water flow (Clark et al., 1985). Vegetation also depletes subsurface water between rainfall events, which reduces the amount of runoff during storm events. In fact, vegetative stabilization on construction sites has been shown to reduce soil loss by 80% (Harbor et al., 1995) to 99% as compared to bare soil (Koehn and Rispoli, 1982). The cost of reducing soil erosion using vegetative cover depends on the materials used, but typical temporary seeding on a one-third acre residential lot in the Midwestern US costs from $250 to $325.

Regulations requiring construction site erosion control

In the US, the biological and physical impacts of off-site sedimentation have prompted local, state, and federal regulations requiring erosion and sediment control for construction sites. The National Pollution Discharge Elimination System (NPDES) is a national program that issues, monitors and enforces permits for stormwater discharges associated

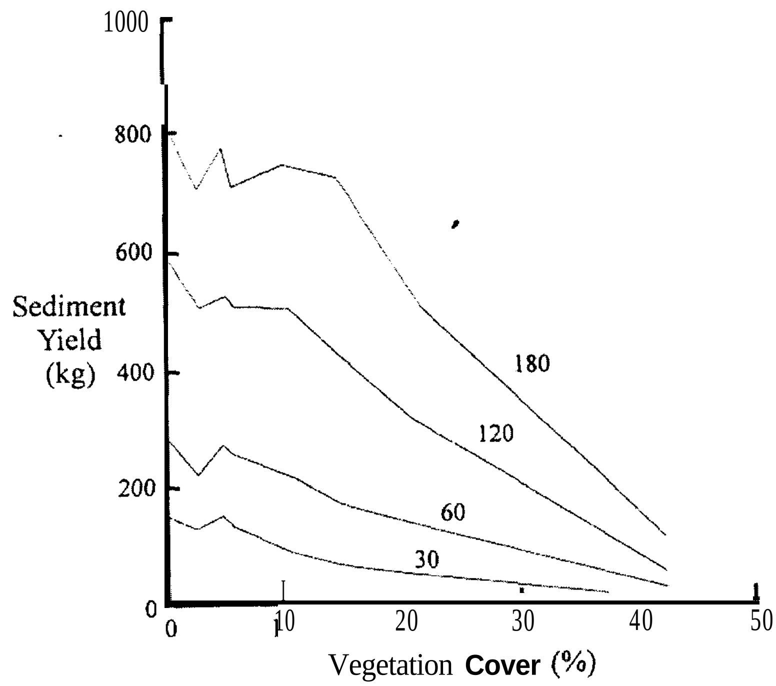

Figure 1. Sediment yields for different vegetative cover densities at 30, 60, 120, and 180 minutes of simulated rainfall on a 10% slope (Rogers and Schumm, 1991).

with industrial activity such as construction under the Clean Water Act (Federal Register, 1990). State and local regulators, under the NPDES program, require erosion and sediment control for construction sites with 5 acres or more of land disturbance (Federal Register, 1990). Because vegetative cover greatly reduces soil erosion, many federal and state regulations, such as Rule 5 in Indiana and the Model Regulations for Urban Soil Sediment Pollution Control in Ohio, encourage the use of surface cover as an important element of erosion control on construction sites.

In Indiana, for example, state regulations mandate that sediment should be contained on the construction site and not, for example, allowed to run onto public or private roadways. Rule 5 requires that if vegetative practices such as seeding and mulching are used, they must be implemented within seven days of the "last land-disturbing activity" at the site and that these actions are the responsibility of the person in charge of the construction activity, which usually is the developer (Indiana Department of Natural Resources, 1992). Similarly, in Ohio, Model Regulations for Urban Soil Sediment Pollution Control (1980) require that the responsible party for the development stabilize denuded areas with permanent ortemporary soil stabilization within seven days for any denuded area that has reached its final grade or is to remain dormant for more than 45 days. The permanent vegetation is not "considered established until ground cover is achieved which.. .provides adequate cover and is mature enough to control soil erosion satisfactorily and to survive adverse weatherconditions"(Ohio Department of Natural Resources, 1980).

Enforcement of erosion control regulations varies significantly among states. For example, in Indiana, the Indiana Department of Environmental Management (IDEM) controls permitting and enforcement, but local soil and water conservation districts (SWCD) review and evaluate erosion control plans. At typical staffing levels, SWCDs in developing areas find it very hard to keep up with the large number of developments they are responsible for. The local SWCDs inspect the construction sites to establish whetherthe developer is implementing the soil erosion control plan correctly and to observe whether the possibility of or the actual transport of sediment off-site exists. The SWCD will provide the developer with written recommendations describing which erosion control measures need to be improved, maintained, or installed. The developer then has two weeks to comply with the recommendations. If the developer is not found in compliance with the requirements after recommendations have been made, the SWCD reports the site to the Urban

Erosion Control Specialist from the Indiana Department of Natural Resources (IDNR), who has been receiving copies of all written warnings to the developer. The Urban Erosion Control Specialist will then visit the site and determine whether the site should be reported to the IDEM. Subsequently, the IDEM determines whether further action, such as levying a fine against the developer, is warranted. This process can lead to delays of many months between identification of a problem and regulatory enforcement.

In reality, it takes a great deal of coercion to get developers to promptly apply erosion control measures on their sites. Developers find applying erosion control measures inconvenient, costly, and time consuming, and are fully aware of the lack of regulatory personnel to enforce local, state, and federal mandated erosion control (Harbor et al., 1995). Therefore, developers often do not comply with the regulations and let their sites remain bare (Harbor, in press; Harbor et al., 1995). When inspected, sites are often either lacking erosion control measures or maintenance of existing control measures is long overdue. The effort (if any) on the developer's part to maintain or implement the erosion control measures is often inadequate and is done to appease the local SWCD, rather than with the goal of achieving 'best management' of the site. Aside from regulation, there is little incentive for a developer to use erosion and sediment control practices. In fact, a developer who uses erosion control may be at a cost disadvantage compared to other developers who do not, thereby making construction less profitable (Harbor, in press).

Origin of this study

In a study evaluating the use of rapid seeding and mulching to reduce NPS pollution from construction sites, one developer commented that he liked seeding because he thought that it made his developments more marketable (Harbor et al., 1995). The developer soon began to include extensive seeding on his other developments to achieve the same neat, green looking result. Even though the developer was interested in seeding because he thought it would give him a competitive edge over other developers, he was voluntarily using vegetative erosion control (Harbor et al., 1995; Harbor, in press). As similar anecdotal evidence accumulated, it seemed possible that a higher market value for a seeded site might provide an incentive for voluntary erosion control. If an economic advantage can be established, then it may be possible to persuade developers to use erosion control on the basis of a profit motive, where regulation and education have proved ineffective. If widespread voluntary application can be achieved by this means of increased profitability, it will make it easier to obtain compliance with erosion control programs and reduce the burden on regulators. Furthermore, and most importantly, the NPS pollution load from construction sites would be reduced.

Methodology

We hypothesize that green, grassed lots are more attractive to buyers and therefore may be valued more highly and sell faster than bare, dirt lots. There are several ways to test this hypothesis, with the most thorough being a detailed tracking of the sales prices and sales timing of a large number of randomly selected treated and untreated control lots on residential constructions sites throughout the US. In the absence of data to perform this type of highly detailed approach, we undertook a pilot study using photos of treated and untreated lots in a market survey questionnaire aimed at establishing whether lots with green vegetative cover are valued higher than barren ones by Realtors, developers, and homebuyers. In the work reported here, however, we do not evaluate whether green, grassed lots sell faster than bare, dirt lots.

Randomly selected lots in three residential housing developments in Ohio and Indiana were seeded and mulched. Photographs of these lots were taken prior to seeding and then when the grass was approximately one inch high (Fig. 2). Lots were photographed from three angles (front left, front center, and front right), and selected photos were used in a lot valuation survey. The market survey was designed as a broad tool to investigate a wide range of factors which homebuyers, Realtors, and developers find important when buying/selling a lot in a residential housing development. The survey included open- and closed-ended questions, and those surveyed were not told the actual purpose of the survey. The survey is reproduced in Herzog (1997). Included within the wide range of questions in the survey were specific questions on the importance of lot appearance, and a lot valuation question in which those surveyed were asked to place prices on lots shown in photographs. Those surveyed were told the lots were in the same neighborhood/subdivision, with the streets and curbs installed and had the samesewer/septic system, water system, and noise level. They were then

Figure 2. Examples of grassed and bare lot photographs used in the survey.

given 10 lot photos and asked to establish prices for each lot, having been told that the average lot value in the development was $20,000.

Most Realtors and developers were interviewed at their offices in St. Joseph County, Indiana and Geauga County, Ohio. Potential homebuyers were interviewed either at a neutral location or at their place of work, and included residents of St. Joseph County and West Lafayette, Indiana, as well as personnel at a chemical engineering facility in Buffalo, New York which was relocating to Philadelphia, Pennsylvania. The survey typically took 10-20 minutes depending on the responsiveness of the individual.

After completion of the surveys, comparative statistics were used on the lot valuation data to assess whether there was any significant difference between “brown” and “green” lot values for Realtors, developers, and homebuyers. Analysis of variance was initially used to be able to test for the existence of significant interaction between the fixed variables (respondent group and color), while taking into account variation that occurs in the random variables (eg., subjects). The assumptions needed to appropriately apply this method, such as normality of the error terms, were found to be satisfied (Montgomery, 1997).

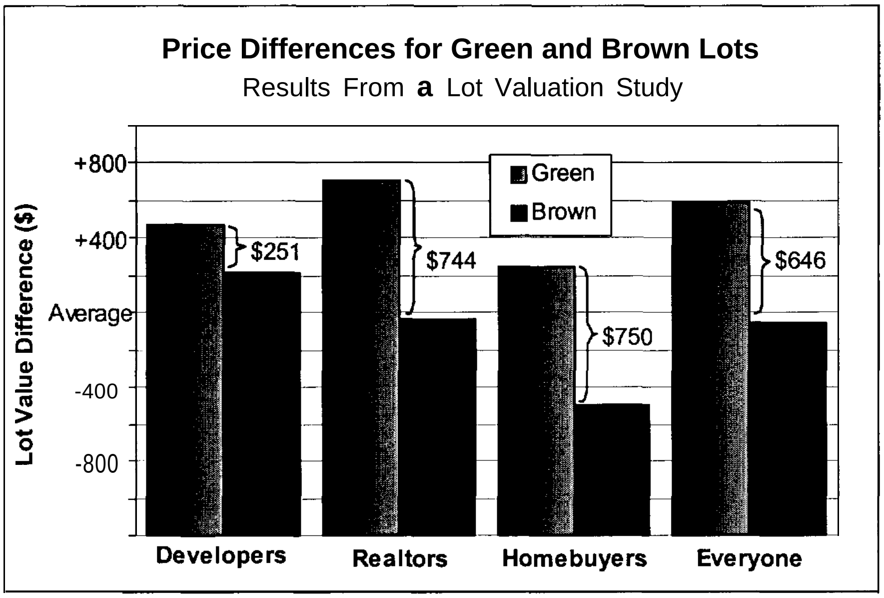

Figure 3. Differences in average prices for green and brown lots between survey groups.

Table 2. Effect of lot treatment on price for three different survey groups

Group	Green Lot Mean Price ($), sample size (n)	Brown Lot Mean Price ($), sample size (n)	Price Difference ($)	Test Statistic	Significance Level (p-value)
Realtors	20,711 (n=155)	19,967 (n=154)	744	t=4.0085	0.0001
Homebuyers	20,250 (n=36)	19,500 (n=36)	750	t= -1.7957	0.0788
Developers	20,469 (n=48)	20,218 (n=48)	251	t= -0.9200	0.3609

An important element of the economic analysis of lot greening is the actual cost involved in applying seed. This can vary widely depending on the method used to apply the seed, and the density of vegetation desired. In this work, we restrict the analysis to an amount and type of cover intended for erosion control, as opposed to grass species and density intended for final lawn cover. For this study we used independent contractors to apply seed, mulch, water and fertilizer by hydroseeding. Other common approaches include use of a hand seeder, and mulching with straw either by hand or using a blower. During dry seasons in some areas, watering may be necessary to produce successful germination and early growth. Thus there is a wide range of possible costs of lot greening. In this study we use the actual cost of hydroseeding for our study sites in Indiana and Ohio, $300 per lot, although we could have applied seed and mulch by hand for about $100 per lot. Readers may want to contact their local Soil and Water Conservation District to get estimates of typical costs for their areas.

Results

A total of 478 lot valuations (310 by Realtors, 96 by developers, and 72 by homebuyers) were made. However, during the survey process, it became apparent that two of the photographed lots were being ranked either highest or lowest based on their specific background (one with a fire hydrant and another with lush tree vegetation behind the lot giving an appearance of more privacy than the other lots). Lot valuations based on these two photos, one green lot and one brown were eliminated prior to the statistical analysis.

Initial statistical evaluation of the entire data set focused on determining if the data fit a model in which price was a function of the overall mean price, effects related to the group, the individual surveyed, the individual lot and the lot color plus interaction and random error terms. In this model we assume that the effect of the particular lot and the particular individual are random variables that are independently and normally distributed with a mean of zero, and also that the error terms are independently and identically distributed as normal random variables with mean of zero and variance σ^2. Analysis of variance followed by a normal probability plot of the residuals, and plotting of the residuals versus the predicted values, demonstrated that the error terms were normally distributed with constant variance (Montgomery, 1997). This analysis also demonstrated that there appeared to be significant differences in the variations of prices between groups, which complicates analysis of the data as a combined group. Thus it was necessary to analyze each group separately, using at test to evaluate the overall effect of color within each group.

Realtors

The Realtors surveyed gave an average value of $20,711 on the green grassed lots and $19,969 on the brown dirt lots. The distributions of lot values for green and brown lots were statistically significantly different at a 99.99% confidence level (Fig. 3, Table 2). As a simple difference between means, the perceived added value for green lots was $742 per lot.

Narrative questions on the survey revealed additional qualitative insight into Realtors' perceptions of lot value, and reasons for preferring green lots. One Realtor commented: "I don't like these mud lots." Others said the grass was more appealing and "easier on the eye," and that the lots look better because they are green. Other Realtors did not see the importance of seeding and believed that grass should not enter into the decision because it will be destroyed in the house building process. "Grass makes it look better but means nothing for what's coming."

Overall Realtors perceived that homebuyers would prefer the grassed lots ("I think people like grass,") and the green lots would sell first because the green grass will remind homebuyers of a yard and allow them to visualize what a house and yard would look like on the lot. One Realtor stated that the grass/ground cover was more appealing than dirt, and that homebuyers "wouldn't like the bare ones very much." Another noted that buyers would be more willing to walk a grassed lot in inclement weather lot because the grass would absorb the moisture and that buyer would not walk a dirt lot because it would become muddy and puddle. One Realtor stated: the green lots look "lush and fertile;" some people cannot visualize dirt lots as possibly being lush and fertile. This Realtor also brought up the concern that a buyer may ask about the drainage if the lot is wet, and if the dirt lot is dry, caked, and cracked, the buyer will wonder if anything can grow on it.

Homebuyers

The homebuyers surveyed placed an average value of $20,250 for the green lots and $19,500 for the brown lots. The distributions of lot values for green and brown lots were statistically significantly different at a 92% confidence level (Fig. 3, Table 2). As a simple difference between means, the perceived added value for green lots was $750 per lot. The added value of $750 (the greatest added value among the groups surveyed) is particularly significant because homebuyers are the ones who actually pay for the lots.

Homebuyers stated that grass gives a realistic impression of the future appearance of the lot and it is more appealing; and that the final product is more difficult to visualize on dirt lots. In general, the homebuyers acknowledged that the grass looks good and has more appeal, while understanding that the lots would be disturbed during construction. One homebuyer said that the green look was nicer but that it "wouldn't effect my decision to buy," because grass was not a "big deal." Even though comments such as these were made, on average homebuyers valued green lots $750 more than brown lots.

Developers

The developers surveyed placed an average value of $20,469 on the green lots and $20,219 on the brown lots. The distributions of lot values for green and brown lots were statistically significantly different at only a 64% confidence level (Fig. 3, Table 2). Typically this would be viewed as indicating no statistically significant difference. As a simple difference between means, the perceived value of the green lots was $250 greater than the brown lots. Clearly, the small difference between the green and brown lots data sets and the comparatively low significance level indicate that developers perceive little or no difference based on lot color.

During the survey, developers addressed the difference between the grass and dirt lots and stated that it should not be a factor in lot price. They pointed out that the green lots will become brown lots during construction and that the homebuyer will put in a yard anyway. Other developers saw that ground cover was more attractive ("I like the green") and perceived that homebuyers would like the grass. Also, some perceived that the green look made a development more marketable compared to other developments; one developer said he "greens up" his developments to make them look more attractive. Another stated that grass makes a lot look like it has topsoil, and if there are soil concerns, the grass demonstrates that vegetation can be grown and is holding soil. One developer remarked how ground cover may be important to homebuyers for more than just appearance. He stated that grass cover is more significant when there is rolling ground because if there is unseeded soil on an adjacent lot, the soil may erode onto the grassed property to the dismay of the homeowner.

The Economic Incentive

Although green lots may be priced higher than brown lots, this gross value is only significant if the price differential exceeds the cost of seeding. The difference in value between grassed and bare lots compared to the cost of seeding provides a measure of potential net economic benefit to the developer. In terms of a simple net return on investment, seeding a lot provides potentially excellent return. Homebuyers valued grassed lots $750 more than brown lots, and as it cost $300 to seed a lot in this study, the developer stands to profit by $450 per lot, which is a 150% return on the initial investment. The ability to more than double an initial investment should be an attractive and sensible advantage for the developer, if the perceived value difference actually translates into a sale price difference.

Present Limitations and Future Work

This pilot study is an initial step in developing information that can be used to persuade more developers to make widespread use of vegetative cover, and other forms of environmental protection. The results of this pilot study are most relevant in areas where climate conditions allow for relatively easy establishment of temporary vegetative cover, and are not applicable to arid or semi arid areas. In addition, budget restrictions limited the scale of the study. Although we collected 478 lot valuations from 62 respondents, a much larger study with respondents from many areas of the United States would overcome a potential criticism that the current study only represents conditions in a small portion of the Midwest. Developers are also more likely to notice results based on data collected within their region, especially if these are coupled with regional demonstration projects. Thus, the next logical step is to initiate a network of coordinated studies in regions experiencing rapid residential development. This would provide for analysis on a national as well as a regional level, and for comparisons between regions.

An additional limitation of the results presented here is that they consider only <u>perceived</u> increase in lot values. In actual sales transactions, buyers may not actually behave in the way they say they would on a survey. As a linked project, it would be desirable to track actual sales histories (timing and pricing) to provide a more complete picture of the actual economic impact of lot greening. Future research should include analysis of a large number of real-world transactions for which lot condition is known. This could be based on a large-scale, long-term study in which researchers intervene to change lot conditions on selected lots or developments. Alternatively, if some landowners are convinced by the results of this study, the experiment might occur naturally in the marketplace as the findings of our work are disseminated.

Further extension of the basic concept of examining the direct profitability of environmental protection is also possible. We were recently contacted by a consultant who had heard of the lot valuation study, and wanted a similar study performed on the increased value of lots next to ponds on developments. Although ponds are often built for stormwater control, and also aid in reduction of nonpoint source pollution, they can also have considerable aesthetic appeal. Thus, it would be potentially very useful to know what the return on investment on a pond is for a new residential development, both in terms of the increased price of lots adjacent to the pond, as well as the increase in average price in lots for the development as a whole because of the improved appearance of the development.

Conclusions

Showing that erosion control may be profitable provides a new way to reach developers who have failed to act on the logic that erosion control provides environmental protection and is required to comply with local, state or federal erosion control regulations. Evaluating the cost of environmental damage is not only very difficult, but also of little direct relevance to a developer who does not directly pay the cost of the damage. Land development is a business, with profit as a leading motive, so appealing to increased profitability is one potentially effective way to change behavior.

The pilot study described here indicates that vegetated lots are perceived to be more valuable and more desirable by Realtors and homebuyers. Realtors perceived that vegetated lots are worth more than barren lots (by $742). They also perceived that vegetated lots are worth more to homebuyers and that homebuyers would be willing to pay more for grassed lots. Homebuyers also perceived grassed lots to be more valuable and put the largest premium ($750) on the lots for all those surveyed. The added lot value is only significant if the price differential exceeds the cost of seeding ($300), which was the case for Realtors and homebuyers by $417 and $450, respectively. Developers valued the vegetated lots higher than non-vegetated lots by an average of $250, but the difference was not statistically significant. Even if it were significant, this price differential is less than the cost of seeding and indicates that developers perceive that seeding costs are greater than the benefits of vegetation. This perception of a net cost associated with greening a lot is perhaps why the market has largely failed to recognize this simple way to increase a property's value. Some developers did recognize the visual appeal of the grass and believed that a greened development would attract homebuyers more rapidly than a development that appears unkempt. However, thevaluation study indicates that developers have not aligned their perception of lot value with that of homebuyers.

An alternative way of interpreting the results is to consider the potential return on the investment in the vegetative cover. For a $300 investment the developer can receive a return of $750, i.e. a 150% return on investment. Such a rate of return is difficult to achieve in most conventional investments. Finally, price differential is not the only economic benefit of lot greening; if lots sell faster because of greening, profits will increase because of lower financing costs for capital invested in the development process. Further research is needed to clearly define the value of this potential economic impact associated with lot greening. However, at this stage it is possible to state that in addition to the environmental benefits, and regulatory requirements associated with using vegetation for erosion control, there may be significant marketing and thus economic returns associated with lot greening.

Education concerning the environmental benefits of erosion control, and enforcement of regulations have not produced widespread, effective use of vegetative cover for erosion control. Because developers generally do not perceive much incentive to vegetate their developments aside from complying with often-ineffective regulations, they typically do not. Typically a developer who is using erosion control practices believes s/he is at a cost disadvantage compared to other developers who are not, thereby making the developer following regulation believe s/he will be less profitable. Furthermore, the developer does not directly pay for the mitigation of the environmental impacts caused by the sediment leaving the site; it is the burden of the taxpayer instead. In this study, we have demonstrated that vegetating a development may be a profitable investment. Appealing to the profit motive will hopefully provide a way to generate widespread use of vegetative cover that also provides erosion prevention on construction sites.

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