

THE WOODED LOT: HOMEOWNER AND BUILDER KNOWLEDGE AND PERCEPTION

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Abstract. Wooded tracts are frequently converted to residential use with residual trees serving as the basis for home landscapes. Homeowners and builders recognize the aesthetic, economic, and functional values of wooded lots, but lack an understanding of tree protection during construction and subsequent tree therapy and maintenance. Recommendations for educational programs are made to provide this information to homeowner and builders.

The use of forested land for home construction has increased rapidly in the past decade (9). Though trees may raise development costs, Payne and Strom (6) concluded that the value of homes on wooded lots "is high enough to cover a developer's higher cost in buying and developing wooded land." Because developers realize the economic benefits involved, efforts have been directed to leaving a portion of pre-development vegetation. Unfortunately, builders and home buyers mistakenly equate leaving trees with preserving trees; thus little concern is given to the preservation of trees and associated vegetation.

The aesthetic, economic, and environmental values provided by woodland vegetation have prompted some communities to develop ordinances protecting trees during development. However, such ordinances are uncommon and ultimately the fate of most of these woodlands rests in the hands of the builder and homeowner. Because of the pivotal role these two groups play in the development process, an understanding of both the attitudes and knowledge of these respective groups is essential if we are to develop methods to forestall tree damage during home construction and to provide adequate management following construction. The objective of this study is to determine the knowledge and perception of wooded house lots held by homeowners and builders in selected subdivisions.

Methods

Homeowners in four selected subdivisions and builders in the vicinity of Stevens Point, Wisconsin,

were surveyed. Each of these groups received separate questionnaires designed to explore attitudes involved in purchasing wooded lots and to determine to what extent they understand the wooded ecosystem.

Homeowners were selected on the basis of their residence on wooded properties in subdivisions which had been developed within the past decade. Builders were selected based on their involvement in construction on wooded lots throughout the study area. A "wooded" lot is defined as a homesite with the presence of a continuous or near continuous forest canopy.

Homeowner questionnaire. The homeowner questionnaire consisted of 28 questions to explore: 1) the relative importance of various factors influencing the buyer's purchase of a wooded lot; 2) homeowner attitudes affecting the management of wooded lots; and 3) the level of knowledge possessed in respect to the protection and management of trees and associated vegetation on their lots. A preliminary questionnaire and letter of explanation was distributed in a trial run to 15 homeowners living on wooded lots outside the study area. Revised questionnaires, along with a cover letter, were randomly distributed to 67 homeowners with 64 returns.

Builder questionnaire. The builder questionnaire consisted of 29 questions designed to examine common construction practices and the level of knowledge builders possess in respect to the protection of trees and associated vegetation. A trial run was not made as the number of builders which could be contacted was limited. All builders in the area were contacted, 22 questionnaires distributed, and 15 returned.

Discussion: Homeowner Survey

Factors influencing purchase. To determine the importance of factors influencing the purchase of wooded lots, 12 factors were presented to pro-

perty owners. They were asked to rate the importance of these on a 5-point Likert scale: strongly agree, agree, neutral, disagree, and strongly disagree. Table 1 indicates that the presence of trees was clearly the most important factor influencing the purchase of their property. Homeowners were also asked, "What percent of the total sales price of your home and lot can be attributed to vegetation?" A figure between 5 and 10 percent is commonly accepted in assessing the contribution of trees to the value of improved property (5, 2). Thirty-seven percent estimated values within the range described above, while 46 percent of the respondents overestimated the value which trees and associated vegetation contribute to their property. Resale value was also found to be important, and this too may be an in-

dication of the desirability of wooded home sites.

Tree attributes. A list of selected tree attributes was presented and prefaced with the statement, "Trees and associated vegetation are valued because they enhance living conditions and the use of your property in the following manner." The attribute most valued in trees was that of lending beauty to property (Table 2). The second most important attribute was that of enhancing resale value, while remaining factors show that the homeowner has some recognition of the tangible role trees play in modifying and enhancing the physical environment. Some caution should be taken here, as homeowners might not give these responses if they were not listed.

Associated vegetation and wildlife. Respondents were given an opportunity to comment on wildlife and vegetation other than trees. Surveyed homeowners felt the amount of shrubs and herbaceous vegetation found on their properties was adequate. The amount of trees found on homeowner properties was also characterized as adequate. While these results seem to indicate that homeowners place as much importance on shrubs and herbaceous vegetation as on trees, this observation should be tempered by noting that most lots in these subdivisions had a profu-

Table 1. Factors most important to homeowners when purchasing wooded residential property.

<i>Factor</i>	<i>Mean *</i>	<i>No. respondents</i>
The presence of trees and other vegetation on my property	4.74	61
Country-like atmosphere	4.23	64
Resale value	4.18	62
The presence of trees and other vegetation on neighboring properties	4.10	63
Location in relation to work	3.75	63
Presence of wildlife on my property	3.67	64
Location in relation to schools	3.67	62
Species of trees and other vegetation on my property	3.66	64
Presence of wildlife on neighboring properties	3.60	64
Architecture of house	3.51	59
Location in relation to an urban center	3.44	62
Bank loan accessibility	3.27	60

*Strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1.

Table 2. Responses to the question "Why are trees and associated vegetation valued?"

<i>Factor</i>	<i>Mean *</i>	<i>No. respondents</i>
Lend beauty to property	4.64	63
Enhance resale value	4.46	63
Provide screening	4.36	63
Modify temperature extremes	4.36	62
Provide wind control	4.27	63
Provide habitat for wildlife	4.18	62
Provide a suitable environment for recreation	3.98	61
Purify the air	3.58	62

*Strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1.

sion of trees, while understory vegetation was almost nonexistent. The lack of understory vegetation and homeowner characterization of this as adequate substantiates the observations of Schmid (8) and Odum and Davis (3) who noted that homeowners have a penchant for removing understory vegetation to create a "parklike" atmosphere.

Homeowners were asked to characterize the amount and variety of wildlife found on their property, and responses indicate that both the amount and variety were adequate. Though homeowners appreciate the presence of wildlife, they were often unable to distinguish one species from another.

Tree size. Van der Grinten et al. (9) noted that homeowners preferred larger trees, and in some instances saved dominant fast growing, short-lived species during development at the expense of the slower growing long-lived understory species. To determine preference in tree removal homeowners were asked, "In the development of your property what percent of the following occurred with respect to vegetation?" Homeowners

reported that thirty-five percent of small diameter trees were removed, while 19.3% of large diameter trees were removed. However, it is unknown whether the developer or the homeowners selected trees for removal.

Homeowner knowledge. A number of questions dealing with trees, tree maintenance, and wildlife were included to examine homeowner knowledge in these areas. Table 3 lists these questions according to subject and correct responses. All questions had one correct answer, with the exception of question 11, "What kind of trees exist on your lot?" and question 19, "List the types of wildlife most common to your lot." These questions were scored according to the respondent's degree of success in identifying tree and wildlife species. (Base line data on species composition were available from a previous survey in the study area.)

The mean score in correctly answering the

Table 3. Homeowner responses to questions concerning the woodlot environment.

Question no.	Subject	Percent responding correctly
6	Shade tree value of 25-inch red oak	3.1
11	Knowledge of tree species	49.1*
15	Pruning techniques	45.3
16	Effectiveness of pruning paint	10.9
17	When to avoid tree fertilization	40.6
19	Knowledge of wildlife	11.5*
20	Location of local bird nests	73.0
21	Maintenance of area around tree base	40.6
23	Contamination of groundwater	81.3

*These numbers reflect respectively the mean number of tree and wildlife species correctly identified.

Table 4. Activities reported by home builders on wooded lots.

Activity	% of builders
Trees removed	93.8
Trenching for underground utilities	93.8
Driveways placed within 0 to 10 feet of trees	87.5
Heavy equipment passing near base of tree	81.3
Raising of grade (fill)	62.5
Foundations placed within 0 to 10 feet of trees	62.5
Sidewalks placed within 0 to 10 feet of trees	56.3
Trees pruned	56.3
Storage of building materials around the base of trees	50.0
Temporary soil storage around the base of trees	43.8
Trees or shrubs planted	37.5
Lowering of the grade	25.0

questions listed on Table 4 was 37.7%. Homeowners scored lowest on wildlife identification and determining the value of a 25-inch red oak. Respondents failed to identify more than half of their trees correctly, and this could have implications for tree management on the lot.

More than half of the respondents could not identify the proper pruning techniques of cutting branches nearly flush with the trunk or parent branch. Nearly flush is used in the questionnaire to describe pruning at the shoulder ring. Only 10% of respondents realized pruning paint was cosmetic and did not prevent decay. Sixty percent did not know that fertilization late in summer can harm trees and the same number felt that sod or bare ground was preferable to mulch around the base of a tree. Seventy-three percent correctly identified nesting sites for local songbirds, a task made easy due to the obvious lack of understory vegetation.

The overall performance reflects that though natural features influence the purchase of the lot, the main component of this influence revolves around aesthetic or ornamental considerations, and homeowners are lacking in sufficient knowledge to adequately manage the lot environment.

Discussion: Builder Survey

Builders were asked to typify their activities when building homes on wooded lots. Various activities associated with home construction were listed, and builders were asked to check those which applied (Table 4). A number of questions dealing with soils, tree maintenance, and forest ecology were presented to examine builder knowledge. All questions had one correct answer, with 1 point awarded for each correct answer. Table 5 lists these questions according to subject and percent correct responses. The highest score was 78%, the lowest score was 14%, and the mean score was 47%. Results of these and other builder knowledge questions are summarized below.

Soils. In general, builders scored high on questions pertaining to soils. When asked to arrange three soil textures according to air and water movement, 93.8 percent answered correctly. The majority of builders also realized that compac-

tion is most severe when the soil is wet, that fill over existing soil levels hinders exchange of air and water with tree roots, and that waste water from mixing cement has the potential for increasing soil alkalinity. However, only 18.8% of the builders were able to correctly arrange sand, loam, and clay soils according to the degree of susceptibility to compaction. This inability to recognize soils prone to compaction is troublesome as 81.3% reported that typically

Table 5. Builder responses to questions concerning the woodlot environment.

<i>Question no.</i>	<i>Subject</i>	<i>Percent responding correctly</i>
14	Soil texture and compaction	18.8
15	Soil texture and water movement	93.8
16	Moisture state and soil compaction	87.5
17	Pruning techniques	56.3
18	Effectiveness of pruning paint	18.8
19	Grass tree competition	18.8
20	Effect of mulch on trees	62.5
21	Soil fill and trees	75.0
22	Heavy equipment and relation to root damage	50.0
23	Pruning to compensate for root loss	50.0
24	Application of fertilizer-root damage	6.3
25	Extension of tree roots	81.3
26	Cement wastewater and soil pH	75.0
27	Tree longevity of selected species	48.5*
28	Benefits of undergrowth vegetation	43.8
29	Shade tolerance of selected species	34.4*

*Mean based on questions relative to tolerance and longevity of 16 species.

their heavy equipment passes near trees and 50 percent store building materials around the base of trees.

Pruning. Questions pertaining to pruning dealt with pruning techniques and the effectiveness of pruning paint in preventing decay. The technique of pruning nearly flush with the trunk or branch was selected by 56.3% of the builders, while only 18.8 percent stated that *pruning paint did not prevent decay*.

Tree-understory relationships. The majority of builders (62.5%) correctly stated that mulch was preferable to grass around the base of trees. Twenty-five percent assumed mulch was used only for cosmetic purposes, and 12.5% felt it had a detrimental effect on trees. Half the respondents felt the presence of grass around the base of a tree is beneficial to the tree, and 18.8% answered that grass competition can be detrimental to trees. The benefits of native understory vegetation were realized by 43.8% of the builders, while 12.5% felt removal of this vegetation was beneficial.

Roots and root damage. The majority of builders (75%) were aware that fill inhibited air and water exchange with tree roots. However, 18.8% of the builders felt fill would have no effect on tree roots, and 6.3% thought fill would improve exchange of air and water with roots. Half the builders recognized that heavy equipment passing near trees can damage both exposed and underground roots, while 18.8% thought heavy equipment would not damage roots, and 31% felt heavy equipment could only damage exposed roots. A large number of builders (81.3%) felt tree roots generally extend laterally at least as far as above ground branches, while the remainder considered this statement to be false.

When roots are damaged, half of the builders agreed a portion of the crown should be pruned. Most builders (87.5%) assumed that the recovery of a tree with damaged roots would be improved by the application of a fertilizer high in nitrogen. Only 6.3 percent properly recommended the application of a fertilizer high in phosphorus, while 6.3% recommended fertilizer high in potassium.

Longevity and shade tolerance. Though there are many factors to consider in favoring a particular tree species, two characteristics, longevity

and shade tolerance, were presented in the questionnaire. Longevity is important, especially when determining the length of time remaining for existing trees, and shade tolerance is important when selecting a species that will grow beneath other trees or which will respond favorably to release. Builder scores on questions 27 and 29 in Table 5 dealing with longevity and tolerance clearly indicate potential problems as builders seem to lack sufficient knowledge to make decisions regarding tree removal.

Recommendations

Findings in this study raise a number of problems which may threaten the health of woodland areas undergoing development. These problems are:

1. Homeowners are purchasing wooded lots for the trees and associated vegetation; however, they lack the knowledge of trees and the woodland environment needed to protect vegetation during and after development.

2. Homeowners often remove understory shrubs and herbaceous vegetation, as well as small diameter trees. These areas are frequently planted in grass, and this practice may be detrimental to the health of remaining trees.

3. Builders are involved in questionable construction practices and many lack knowledge necessary to protect residual vegetation.

In some communities ordinances are used to protect woodlands during development. Ordinances can protect trees during development, but are not always feasible and do not prevent homeowners from cutting down trees and/or practicing poor maintenance. If homeowners and builders lack adequate knowledge to protect wooded lots, there is a need for education. Biles and Deneke (1) reported one of the more successful public relations programs has been the Texas Urban Forestry Seminar for Builders and Developers. Local seminars of this nature in cooperation with various educational agencies' aid in the education of developers and builders. Tailoring these seminars to include homeowners would further ensure protection of residual vegetation. Based on this study appropriate topics to include in such seminars are: basic tree physiology (with implications for development and

maintenance), woodland and tree ecology, basic soils science, and tree protection and maintenance.

While seminars present useful information on how to protect trees during and after development, this may not be enough. Entrenched landscape tastes favor park-like landscapes with broad expanses of grass and large trees. Schmid (8) states, "If the planting and maintenance practices customary through a homeowner's previous experience in open landscapes are applied without changes to forested tracts, any woodland present soon vanishes." For many homeowners, the maintenance of a tidy landscape with manicured lawns is held to be a community responsibility (7) and the disharmony between native trees and an introduced understory goes unnoticed.

If the health and beauty of these areas is to be maintained, homeowners should be encouraged to maintain a portion of their lot in a natural condition. Emphasis should be placed on preserving natural groups with the forest floor left undisturbed rather than preserving individual trees (4). Natural ecosystems have been enjoying a current fashionable interest (10), and could become a popular style for residential vegetation if individuals are made aware of the many benefits this type of landscape provides.

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Abstract

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Landscape trees and shrubs constitute a major investment and add significantly to the beauty and value of residential and commercial properties. Landscape managers need to be familiar with woody plants, their requirements for survival and vitality, and their pest problems to implement effective insect control programs. Most native trees and shrubs on undisturbed sites suffer only rarely from ravages of insect pests. However, trees growing in landscapes are commonly stressed by lack of water (or too much water if there is poor drainage), high temperatures, compacted soils, and other factors that reduce the tree's ability to either repel or withstand insect attack without suffering decline. Most major pests of trees and shrubs are probably opportunists that exploit hosts that have been altered by their physical environment. Landscape managers can take advantage of the information in this article to develop strategies for controlling insect pests of woody plants. The information is organized according to season of insect activity. The time or times an insect is vulnerable to a direct control tactic and up-to-date insect control recommendations are provided.