Social Aspects of Urban Forestry

FREEWAY ROADSIDE MANAGEMENT: THE URBAN FOREST BEYOND THE WHITE LINE

by Kathleen L. Wolf

Abstract. A national survey was conducted in the United States to learn more about public preferences and perceptions regarding forest and vegetation planning and management in urban freeway roadsides. In response to images depicting a visual continuum of landscape management treatments, drivers most preferred settings having tree plantings that screen adjacent commercial land uses. Preference results suggest solutions for landscape practices that create visual quality for drivers and provide visibility for commercial properties adjacent to freeway roadsides. The research also investigated public attitudes about roadside functions, uses, and public willingness to support roadside management expenditures. Increasingly, transportation agencies are designing urban roadside landscapes to achieve multiple objectives and perform multiple functions. This research offers insights on how to incorporate urban forestry into the planning and management of high-speed urban transportation corridors.

Key Words. Urban forestry; public perceptions; transportation; social science.

Beyond the white line at the freeway edge is the roadside, strips of public land that provide a buffer between high-speed driving and adjacent land uses. Roadsides are a sizeable landscape resource in the United States. The state of Washington alone has 39,000 ha of roadside lands. The driving public has ever-increasing experiences of the roadside landscape, with U.S. drivers spending more time in their cars each year. In recent decades in the United States, the annual average km of travel, number of trips, and mileage per trip have increased 60% to 82% (U.S. FHA 1990). Much of that road time is spent on urban high-speed roads. Drivers in the United States currently travel about 3.8 billion vehicle km per day on 102,000 km of urban freeways and highways (U.S. FHA 1998).

Most public lands, including freeway roadsides, have become multi-tasking. Public lands in cities face continually expanding programs of activities and functions due to public needs and citizen urgings. While initially dedicated to providing safety buffers, Lady Bird Johnson's Highway Beautification movement of the 1970s expanded the role of roadsides to include visual and aesthetic quality. More recently, roadsides are managed by transportation agencies to facilitate wildlife movement, reduce stormwater runoff, and enhance air quality.

Urban stakeholders influence such management practices. One roadside user group can be particularly insistent. Commercial and business interests often pay premium prices for roadside real estate, acknowledging the visibility of such parcels to thousands of daily passing motorists. Meanwhile, design standards have been developed to enhance visual quality of highway roadsides and rights-of-way. The guidelines often urge conservation and preservation of existing urban forests, while promoting additional tree plantings. Often, business interests strive to maintain "commercial windows" in the roadside and may deter efforts to implement urban forestry and other landscape design goals in public roadsides.

What is the driver's experience of the roadside? What is the importance of that experience in relationship to the planning and management of roadsides? This report comprises one phase of a national study on the role of vegetation in roadside visual quality in urban and semi-urban settings. The survey-based research evaluated public response to trees and views in the freeway roadside environment using landscape assessment methods. Results integrate visual preference outcomes and perceptual responses.

BACKGROUND AND RESEARCH QUESTIONS

The social sciences offer theories and methods for assessing multiple stakeholder perspectives associated with any public landscape. These approaches, used often in studies of human response to urban residential settings and parks (Schroeder 1992; Dwyer et al. 1994) or wildland landscapes (Ribe 1989), have rarely been applied to the study of transportation landscapes. Schauman et al. (1992) observed that there is "no body of research … on the relationships between the driver and the landscape beyond the paved area of the road." An overview of the infrequent research efforts yields insight into the complex yet subtle interrelationship of roadside environment, human psychology, and the driving experience.

Visual and Aesthetic Quality

Public opinion about a scenic corridor in California is an example of how visual values can be integrated into highway planning (Evans and Wood 1980). People judged simulations of proposed roadside residential development for

scenic quality. "Cluttered" and "ugly" were terms drivers used to describe roadside development, while "pleasant" and "beautiful" were descriptions of highway corridors containing mostly vegetation.

Generally, high complexity in urban scenes—created by roadside objects, building density, utility poles, overhead wires, and signage—degrades perceived visual quality. Visual richness (e.g., moderate complexity) evokes interest; visual clutter and chaos reduce preference (Nasar 1998).

Roadside Appearance and Cognition

There are multiple levels of psychological response to environments. Judgments of aesthetics are often associated with affect, cognition, and behavior. Two studies illustrate the associative behaviors of visual interpretations.

Transportation engineers design paving, associated structures, and signage to meet functional expectations for specific road types (freeways, arterials, etc.). If drivers misperceive a road type, they may operate their vehicle in a way that is inconsistent with the road specifications, endangering themselves or others. A study of road categorization was conducted to compare driver perceptions of road types to "official" road categories (Riemersma 1988). Contextual conditions and roadside elements contributed more to drivers' subjective distinctions of roads than did intentional indicators (e.g., road markings, placement of emergency lanes).

Another study tested route choice (Ulrich 1974). Two parallel roads provided access to a nearby shopping center—one a scenic parkway route, another a faster and nonscenic expressway route. Despite the parkway route taking more time and having more stops, study participants chose the scenic route more than half the time. Drivers reported feelings of relaxation and enjoyed views of nature on the parkway route. The study demonstrates positive affects of naturalistic roadways and suggests one strategy for traffic routing in transportation planning.

Driving and Physiology

As drivers spend more time on the road and in congested traffic each year, driving stress becomes a public health issue. Changes in mind and body are documented for all driving experiences. Both heart rate variability and blood pressure increase when a person is driving compared to nonactivity situations. Demanding driving conditions, such as on-ramps, off-ramps, and roundabouts, increase stress response (Rutley and Mace 1972).

Commuting may be one of the most stressful experiences of urban life. Stress indicators, such as increased blood pressure, are associated with longer or more difficult commutes. Other affects have also been noted—lowered job satisfaction, higher illness and absenteeism rates, and lower performance on various cognitive tasks (Novaco et al. 1990).

Empirical studies confirm the restorative effects of passive nature experiences in many situations (Ulrich et al. 1991; Kaplan 1995). A comprehensive evaluation of the effects of roadside character on stress response reveals that driver viewing of built-up, strip-mall-style roadside environments both slows down and impedes physiological recovery from stressful stimulus (Parsons et al. 1998). Study participants exposed to roadside nature scenes (forests or golf courses) returned to normal baseline measures faster and had a greater ability to cope with introduced stressors. An "immunization effect" was confirmed; exposure to a natural roadside setting decreased the magnitude of response to a later stressful task.

Research Purposes

The sparse research literature hints at the psychological importance of drivers' visual experiences of the roadside. Human perceptions and benefits should be integrated into planning for high-speed transportation. Several research questions guided this investigation of roadside amenities in urban and semi-urban settings:

1. How does the urban forest, and other physical elements, contribute to the visual quality of the freeway roadside?
2. Does the public support roadside management for visual and other landscape functions?
3. Are differences in drivers' roadside perceptions associated with demographic traits?

METHODS

The research data were obtained in October 1999 using surveys. The eight-page instrument began with a photo-preference activity. Several additional banks of variables were provided to capture attitudes about roadside views, features, suitable uses, and fiscal support for roadside programs. Demographic variables elicited information about driving behaviors and socioeconomic traits.

A photographic image sample was generated for the survey using a combination of photography of actual freeway roadside settings and digital editing. Six base images, selected by an expert panel, were judged to be freeway conditions typical of temperate North American cities. Base images contained foreground views of roadside and mid-ground views of commercial uses—motel, retail mall, auto dealership, recreational vehicle sales lot, mid-rise office building. Known confounds in public preference response were avoided (e.g., overhead utility lines, littered or untidy settings). Each base image was digitally edited to include six conditions of varied landscape treatment. The final presentation set contained 36 black-and-white images, randomly presented.

Licensed drivers were sampled within designated geographic areas of the United States. A nested sampling

procedure was used to first identify geographic areas for mailing and then specify the questionnaire recipients within those locations. Local partners identified "edge cities" within major metropolitan areas—Seattle, Washington; Minneapolis, Minnesota; Detroit, Michigan; and Baltimore, Maryland—for mailings. Addresses were randomly selected from a combination of statedrivers licensing agencies and list broker sources.

After pre-testing, 3,000 surveys were mailed, followed by reminder cards. Mailing procedures generated 404 reasonably complete responses and, given that 421 were nondeliverable or were returned without response, the response rate was 16%. Sommer et al. (1990) report that typically 20% to 25% return is expected of mail surveys of city residents, while Elmendorf and Luloff (2001) report that response rates have fallen. The possibility of nonresponse bias must be considered.

ANALYSIS AND RESULTS

Respondent Traits

Reported age of respondents reflects demographic trends of the United States: 45% were in their 40s or 50s, 32% indicated 30s or younger, and 23% specified 60s or older. Gender distribution is approximately that of the U.S. population. Income was well distributed, with 25% of reporting households having incomes of up to US$35,000, 43% indicating US$35,000 to US$75,000, and 32% earning more than US$75,000.

When asked, "What is the size of the community you live in?" large city (>100,000 population) was indicated by 22%, small city (20,000 to 100,000) was chosen by 21%, and "suburb of a large city" registered at 42%. Respondents were also asked to recall their typical driving habits. Most drivers claim to spend fewer than 10 hours per week in a motorized vehicle (57%). Of time in a vehicle, 36% claim 3 hours or less per week on a high-speed road, compared to 28% for 4 to 6 hours.

Image Preference and Perception

Preference Means. How do drivers react to roadside vegetation content and arrangement? Respondents were asked to indicate how much they liked the kind of setting depicted in each scene by circling a number on a five-point Likert scale, with 1 denoting "not at all" (low preference), while 5 indicated "very much" and high preference.

Several analytic procedures were used to interpret data meaning. Images were sorted by preference means; high and low scenes are in Figure 1. An approximate three-point difference between the high- and low-rated images indicates the degree to which the public associates trees and reduced views of built settings with visual quality.

Dimensional Analysis. Principal axis factor analysis with Varimax rotation generated factors based on observed covariation of individual items. Several decision rules were employed to determine inclusion of images and promote meaningful definition and naming of underlying response categories (Kaplan and Kaplan 1989).

Five categories accounted for 57% of the total variable variance. A total of 27 images were included; nine remaining items did not meet the category criterion. New dependent variables were constructed by aggregating mean values for each variable across all category items for each participant. An expert panel reviewed and labeled the categories: Barren Edge, Prominent Buildings, Ornamental Frame, Tree Buffer, Tree Screen (Figure 2).

Barren Edge images display no trees and few shrubs in the roadside; visible vegetation is scruffy or roughly mown grass and weeds. Adjacent commercial property uses (e.g., buildings, large products) are highly visible. Prominent Buildings scenes also contain little vegetation, and buildings dominate views. Ornamental Frame depicts shrub and tree combinations that soften visual obtrusiveness of built elements and screen ground-level views into the commercial

Mean 4.52 (high), 0.76 SD

Mean 1.40 (low), 0.78 SD

Figure 1. High/low preference scenes.

Barren Edge
8 images, loadings .616 to .794
Category mean 1.56, .70 SD

Prominent Buildings
2 images, loadings .590 to .640
Category mean 1.66, 0.77 SD

Ornamental Frame
10 images, loadings .590 to .744
Category mean 2.71, 079 SD

Tree Buffer
2 images, loadings .497 to .674
Category mean 2.88, 0.86 SD

Tree Screen
7 images, leadings .419 to .797
Category mean 3.87, 0.74 SD

Figure 2. Image categories.

zone. The Tree Buffer category shows dispersed trees acting to visually diminish mid-ground buildings or products and create a greater sense of visual balance between the built and natural elements of the scene. Finally, Tree Screen contains nearly solid masses of trees that conceal what lies beyond the right-of-way; the viewer detects buildings but has no cues as to their commercial purpose.

Comparing Response. Means comparisons tests were conducted on category preferences for driver subgroups ($\alpha = .05$). No significant differences across image category means were detected for driver age, household income, time spent in a motorized vehicle each week, or time spent per week in a vehicle on high-speed roads. Differences were discovered in Ornamental Frame; mean ratings by drivers from large cities are significantly lower than preferences expressed by respondents from suburbs ($F = 4.43$, $df = 2$, $p < .01$).

Roadside Views Features

Respondents indicated their level of agreement with 20 statements about visible features in the roadside, using a scale from 1 (not at all) to 5 (a great deal). Again, descriptive statistics were generated, followed by dimensional analysis and respondent group comparisons (Table 1). Sixteen statements sorted into categories; four items did not meet the inclusion criteria.

Considered from high preference to low, Vegetation Views describes the most appealing landscape features. "Seasonal changes of roadside plants are interesting" attained the highest rating (4.53) of the entire item set, suggesting the visual value of careful plant selection in design. Also included is the lowest-rated item, "having lots of plants along the road is boring," with the 1.43 mean indicating disagreement. The category mean of 4.37 is notably higher than the remaining four categories, reflecting the degree to which quality landscape is valued by the public.

The second category, Built Attractions, has a relatively high rating (3.64) compared to public judgments of built environments in other urban studies (Kaplan and Kaplan 1989; Herzog and Gale 1996). The highest-rated category item, "there should be a blend of built and natural features near the road," suggests that favored urban driving environments can include a visual balance of natural elements and buildings.

The latter three categories, composed of two statements each, capture specific attributes of the view beyond the road. Large signs are *not* preferred in roadside views, which is consistent with MacGillivary (1969), who found that as the density of billboards increases within a section of road, there is a corresponding decrease in public opinion of visual quality. Category 4, with a low rating, indicates that drivers do pay attention to the streaming landscape while driving. Finally, Trees and Safety responses suggest that trees are not considered to be safety hazards. This outcome merits further research because transportation engineers often limit tree planting in roadsides on the premise that they present hazardous visual or physical obstructions to drivers.

One-way ANOVAs and t-tests were conducted to determine the relationships between demographic traits and category responses; significant results ($\alpha = .05$) are reported. Considering age, older drivers are more likely to regard trees as safety hazards ($F = 4.17$, $df = 2$, $p < .02$) but are less likely to

Table 1. Roadside features.

Factor categories and items	Mean rating	SD	Factor loading
Category 1: Vegetation Views	*4.37*	*0.57*	
I like to see a variety of plants in the roadside	4.43	0.73	.752
Having lots of plants creates a pleasing setting	4.46	0.76	.628
Having lots of plants along the road is boring*	1.42	0.79	–.560
The seasonal changes of roadside plants are interesting	4.53	0.67	.545
I enjoy seeing large trees while driving	4.52	0.67	.480
I often choose travel routes because they are scenic	3.86	1.21	.415
Category 2: Built Attractions	*3.64*	*0.70*	
I find the views of nearby architecture to be interesting	3.38	1.01	.585
There should be a blend of built and natural features near the road	3.57	1.05	.559
I find views of neighborhoods to be interesting	3.14	1.07	.548
I enjoy driving through communities with character	4.33	0.83	.474
Category 3: Large Signs	*2.18*	*0.90*	
Large signs are appropriate for roadside advertising	2.30	1.06	.635
Billboards and large signs should be regulated*	4.03	1.08	–.599
Category 4: View Attention	*1.86*	*1.03*	
I don't pay much attention to what's beyond the paved edge	2.04	1.19	.872
I rarely notice the view while driving	1.77	1.20	.659
Category 5: Trees and Safety	*2.22*	*0.97*	
Trees can block or distract me from seeing signs	2.39	1.19	.652
Trees near the road are a safety hazard	2.00	1.10	.514

*Inverse value used for category calculations.

pay attention to roadside content ($F = 14.92$, $df = 2$, $p < .000$) and do not find large signs to be as serious an issue as do younger drivers ($F = 7.22$, $df = 2$, $p < .001$). Household income also is associated with varied attitudes. Higher-income respondents (>US$75,000) report paying more attention to the roadside ($F = 5.38$, $df = 2$, $p < .005$) and being less concerned about trees as safety hazards ($F = 5.93$, $df = 2$, $p < .003$). Those who spend more time each week in vehicles on high-speed roads claim to pay more attention to the road ($F = 5.24$, $df = 2$, $p < .006$), while those spending moderate amounts of time on the road (4 to 6 hours per week) indicate higher interest in Built Attractions ($F = 3.60$, $df = 2$, $p < .02$).

Suitable Uses

In earlier decades, safety or beautification were roadside design priorities; today other functions are planned for roadside lands. How suitable does the public find these uses? Respondents were asked to indicate their level of agreement with 18 statements, using a scale from 1 (not at all) to 5 (very much). Table 2 displays results of dimensional analysis (13 variables sorted into three categories).

The highest-rated statement (4.31), "planned to create a scenic highway," double loaded and, therefore, was not included in any category. The next highest-rated item (4.29) was "location for directional and mileage signs." High ratings on both statements suggest drivers are pragmatic in approving guidance aids at the freeway edge but desire attention to aesthetics in design and placement of such operational elements.

Reviewing category breakouts, Management Traditions has the highest mean rating, again reflecting public interest in practicalities of visual screens and noise buffers. Fairly high rating of Ecological Functions demonstrates public support for an emerging strategy in transportation design. Finally, item ratings within Commercial Communications suggest public ambivalence about various commercial signage and view options at the freeway edge.

When considering respondent demographic traits and category means, no statistically significant differences were observed.

Planning and Funding Support

Citizens may indicate agreement with a variety of roadside functions or uses, but are they willing to commit the resources needed for implementation? This research discovered ambivalent attitudes.

Summary statistics and dimensional analysis were carried out on eight statements, each having a level of agreement response scale of 1 = strongly disagree to 7 = strongly agree. Seven statements sorted into three categories (Table 3).

Policy Priority received the highest mean rating, demonstrating a slightly positive endorsement of public funds for roadside planting and maintenance. But when asked about support, respondents were uncommitted. Both Indirect Support and Direct Revenue Support categories have means at the neutral point; large standard deviations imply diverse levels of fiscal willingness to pay for roadside programs. Review of response dispersions for Direct Revenue Support reveals that approximately 5% indicate 2 (disagree) or lower, while about 23% come in at 6 (agree) or higher. Neither group differs significantly on demographic traits.

Demographics and categories comparisons revealed several statistically significant responses ($\alpha = .05$). An increase in age is associated with both an increase in Policy Priority ($F = 5.64$, $df = 2$, $p < .004$) and decrease in Indirect Support ($F = 9.78$, $df = 2$, $p < .000$). Middle-income respondents ($US35,000 to US$75,000 per household) most endorsed Indirect Support ($F = 3.56$, $df = 2$, $p < .03$), while increased approval of Direct Revenue Support is consistently associated with rising income levels ($F = 3.40$, $df = 2$, $p < .03$). Those spending more time on high-speed roads each week are more willing to commit both more indirect ($F = 9.42$, $df = 2$, $p < .000$) and direct resources ($F = 4.51$, $df = 2$, $p < .01$) to roadside program support.

Table 2. Suitable uses.

Factor categories* and items	Mean rating	SD	Factor loading
Category 1: Ecological Functions	*3.58*	*1.00*	
Place for protecting wetlands	3.70	1.24	.873
Managed to protect native plants	3.96	1.08	.738
Managed for wildlife habitat	3.20	1.36	.634
Place to collect and retain rainwater	3.41	1.19	.576
Category 2: Commercial Communications	*3.05*	*0.71*	
Managed for open views, to better see near by businesses	2.40	1.02	.735
Display space for business signs	2.37	1.05	.641
Gateways and welcoming signs for communities	3.66	0.96	.560
Views that include a combination of built and natural elements	3.54	0.94	.494
Location for clusters of small signs that list nearby businesses	3.19	1.14	.469
Category 3: Management Traditions	*3.99*	*0.62*	
Planted with vegetation to screen adjacent buildings	4.09	0.92	.612
Designed to buffer traffic noise for nearby homes	4.13	0.90	.486
Managed for a formal, refined appearance	3.45	1.08	.414
Location for directional and mileage signs	4.29	0.79	.397

*Principal axis factoring with Varimax rotation.

Table 3. Policy and funding.

Factor categories* and items	Mean rating	SD	Factor loading
Category 1: Policy Priority	*5.18*	*1.30*	
State government should set aside more money for roadside planting and maintenance	5.27	1.46	.894
Federal government should set aside more money for roadside design and maintenance	5.01	1.59	.723
Roadside landscape and planning for scenic views should be a public priority	5.23	1.50	.569
Category 2: Indirect Support	*4.11*	*1.65*	
I would be willing to volunteer for local roadside planting projects, to install trees and shrubs	4.11	1.75	.916
I would be willing to volunteer for local roadside maintenance projects, such as Adopt-a-Highway	4.12	1.71	.888
Category 3: Direct Revenue Support	*4.34*	*1.98*	
I would be willing to pay a 1/4¢ per gallon gas tax for roadside improvements	4.23	2.12	.878
I would be willing to pay an additional $1.50 for my motor vehicle registration for roadside improvements	4.45	2.15	.757

*Principal axis factoring with Varimax rotation.

DISCUSSION

The purpose of this study was to provide empirical data that could inform planning and management of freeway roadsides. This public land resource, comprising landscape ribbons that criss-cross many urban areas, may have an impact on drivers proportionally greater than other more expansive public lands due to the frequency and duration of driving activity. Other social science studies of urban forestry (and urban green in general) reveal a plethora of psychosocial benefits associated with passive experiences of nature. In addition, prior research indicates that roadside elements influence driving cognitions, behavior, and physiology.

An effort was made to systematically assess public preferences for blends of built and natural elements in roadside views. Using digital editing, variations in amounts and arrangements of trees and associated vegetation were presented to licensed drivers in urban areas across the United States for preference response. Additional questions were used to gauge public support and agreement with various functional attributes of roadsides and to gain some understanding of the level of resources support that citizens are willing to commit.

Results Overview

Generally, visual preference for roadsides increases with both increased quantities of vegetation in the image and increased height and density of trees in relationship to commercial views. Scenes with barren roadsides and views beyond of prominent buildings or large products earned the lowest ratings. Unfortunately, they depict the visual condition of many urban roadside situations. In the mid-range of preference are images with intermittent trees and/or a low-growing shrub mass. Plants create horizontally or vertically framed views of commercial uses, combining vegetation amenity with the opportunity to determine what types of commercial uses lie beyond the road. Finally, full tree screening is most appreciated by survey participants, suggesting underlying tensions in roadside management policy as business interests insist on open views. Some demographic traits are associated with minor variation in image response, yet the prevailing trend in preference across all respondent groups is greater appreciation of freeway roadsides having trees.

These outcomes are consistent with public evaluations of many landscape settings. Kaplan (1983) and Schroeder (1989) concluded, in reviews of research on nature in the urban environment, that trees are highly valued components and that unkempt nature is less preferred than well-maintained vegetation.

Also, in prior research, people respond to scenes based on the relationship or balance between human influence and natural content (Kaplan and Kaplan 1989). Generally, scene ratings above 3.5 for images depicting human influence are bestowed on scenes containing an element that does not dominate natural content, say a boardwalk or a single small structure in a park setting. Here, highly rated scenes depict settings that are distinctly urban, suggesting that visual quality in urban settings can be enhanced with careful blending of hardscape and nature.

Respondents are ambivalent about contributing additional resources, be it volunteer time or money, to roadside management. Perhaps an unwillingness to dedicate resources is due to an observed perception that plants can "take care of themselves." Urban forestry professionals must often convince the public and elected officials that trees in urban environments require sustained care.

Ecological functions, such as wetlands protection or stormwater retention, are deemed moderately suitable in the

roadside. While the width of most roadside lands may preclude large-scale ecological restoration, the linearity of roadsides may provide connectivity for fragmented urban ecosystems.

Respondent age influences roadside attitudes. Older drivers highly prefer trees as visual screening but are more likely to regard trees as safety hazards. They are not as concerned about large signs. They indicate greater agreement with roadsides as a policy priority but are no more willing to commit indirect or direct resources for program support. This information is valuable as transportation agencies find themselves interacting with an ever-older client base.

Limitations

Black-and-white photographs offer a low-cost approach to providing visual images for public response, and preferences for places shown in photographs correlate highly with response to onsite locations (Stamps 1990). Nonetheless, in this research static images were used to represent high-speed landscape experiences (due to budget constraints). Additional research is needed to corroborate reported image preferences and perceptions, perhaps using driving simulators.

Despite considerable effort to construct a representative sampling frame, nonresponse is a serious impediment to making inferential interpretations of urban populations. Individuals who did not respond to the survey may hold different values and perceptions regarding roadside amenity than comparable individuals who did respond. Thus, results should be considered narrowly applicable to populations having a demographic profile similar to the respondents.

Little research has been done to understand the role of urban forestry in roadside visual quality. Generalizability of these findings may be limited, yet they provide initial public input on a situation that is important not only to the driving experience but also to the environmental health of cities.

Design and Planning

While other roadside functions and features were included in the research, the most direct experience of the freeway edge is visual. Agencies and organizations (e.g., U.S. Forest Service, Federal Highway Administration) have devised normative guidelines for managing visual quality in transportation corridors. Most focus on rural and wildland settings, failing to address urban and semi-urban (e.g., suburbs, strip development) contexts. Eighty percent of Americans live in urban communities and spend most of their travel time in built environments.

Applied guidelines for urban visual quality are desirable, but creating standards can be fraught with complexity. Respondents most preferred having views of trees versus built elements. However, this design response is not always feasible. In some climatic zones, such a landscape approach is extremely costly. In addition, roadside designers must often juggle the demands of multiple (sometimes competing) interest groups. Drivers may prefer screening vegetation, but this practice may not be consistent with expectations of adjacent property owners or the economic development plans of neighboring communities.

Mid-level responses on this study's verbal and visual variables suggest how to achieve compromise in design, thereby "getting to yes" (Fisher and Ury 1991) with diverse interest groups. Visual categories Ornamental Frame and Tree Buffer contain intermittent vegetation masses (vertical and horizontal) that exclude the visual impact of complex ground-level elements (e.g., parking lots). Trees and vegetation serve as a green "frame" to momentarily focus the driver's eye. Presenting businesses and their products using vegetation frames may help drivers to more easily distinguish individual retailers within an unceasing stream of complex roadside stimulus, while reducing visual distractions that can influence driver response and safety.

Better understanding of public perceptions has had impacts on policy, planning, and design of a variety of built and natural environments. This project and others like it advance integration of public interests and professional practices in roadside landscapes. Empirical data can contribute to more defensible policy regarding urban forestry and greenspace in transportation corridors.

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Résumé. Une enquête nationale a été réalisée afin d'en apprendre plus sur les préférences du public et leurs perceptions en regard de la planification et de la gestion de la forêt et de la végétation urbaines le long des grands axes routiers des villes. En réponse à des images décrivant un continuum visuel d'aménagements paysagers, les conducteurs ont dit préférer les zones où les arbres plantés ont pour effet de cacher la vue des secteurs à usage commercial qui sont adjacents. Les résultats quant aux préférences suggèrent des solutions de pratiques d'aménagement qui créent un espace visuel de qualité pour les conducteurs et fournit une visibilité pour les propriétés commerciales adjacentes aux grands axes routiers. Cette recherche a aussi enquêté quant aux attitudes du public à propos des fonctions des abords routiers, des usages et du désir public à appuyer des dépenses pour l'aménagement de ces abords. De manière croissante, les agences de transport conçoivent des abords routiers aménagés en milieu urbain afin répondre à des objectifs et des fonctions multiples. Cette recherche offre des aperçus sur comment intégrer la foresterie urbaine dans la planification et la gestion des corridors rapides de transport en milieu urbain.

Zusammenfassung. Es wurde eine nationale Umfrage durchgeführt, um mehr über die öffentlichen Vorlieben und die Akzeptanz in Bezug auf Forst- und Vegetationsplanung und Management in urbanen Strassenzügen zu lernen. In Reaktionen auf Bilder mit fortgeführten Landschaftsbaumaßnahmen bevorzugten die Autofahrer am meisten Baumpflanzungen, die die kommerzielle Nutzung neben der Straße verdecken. Die Ergebnisse zur den Vorlieben ergaben

ein klares Votum für Landschaftslösungen, die eine visuelle Qualität für Fahrer und eine Sichtbarmachung kommerzieller Grundstücke entlang von Schnellstraßen liefern. Die Forschung untersuchte ebenfalls die öffentliche Einstellung zu Straßenfunktionen, Nutzung und öffentliche Bereitschaft, dieses Landschaftsmanagement zu unterstützen. Mit wachsendem Anteil entwickeln Transportunternehmen Straßenlandschaften um multiple Ziele zu erreichen und multiple Funktioen zu erfüllen. Die Forschung gibt Einblick, wie urbane Forstwirtschaft in Planung und Management von innerstädtischen Schnellstraßenkorridoren einzubinden ist.

Resumen. Se llevó a cabo un estudio a escala nacional para aprender más acerca de las preferencias del público y la percepción acerca de la planeación y manejo de la vegetación en los senderos aledaños a autopistas urbanas. En respuesta a las imágenes de tratamientos que describen un continuo visual de manejo del paisaje, los automovilistas prefirieron escenarios con plantaciones de árboles que enmarcan usos comerciales adyacentes. Los resultados de esas preferencias sugieren soluciones para prácticas en el paisaje que creen cualidades visuales para los manejadores y proporcionen visibilidades para propiedades comerciales adyacentes a las autopistas. La investigación también estudió las actitudes del público acerca de las funciones de las áreas aledañas en las autopistas, los usos y las preferencias del público para apoyar los gastos de manejo. En respuesta, las agencias de transportación están diseñando paisajes aledaños a las autopistas que logren múltiples objetivos y realicen múltiples funciones. Esta investigación ofrece luces de cómo incorporar el bosque urbano a la planeación y manejo de los corredores de autopistas de alta velocidad.