Forest Aesthetics, Biodiversity, and the Perceived Appropriateness of Ecosystem Management Practices

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Abstract

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The social acceptability of "ecosystem management" and related new forestry programs hinges on how people view the forest environment and what it means to them. For many, these conceptions are based on a "scenic aesthetic" that is dramatic and visual, where both human and natural changes are perceived negatively. In contrast, appreciation of biologically diverse forests created through ecosystem management practices depends on experience of the subtle, multimodal characteristics of a dynamic environment, an aesthetic attitude that is acquired and cognitive rather than immediate and affective. Society is unlikely to quickly adopt this "ecological aesthetic" as espoused by Aldo Leopold and others. However, the concept of appropriateness could serve as a short-term alternative for resolving perceived conflicts between aesthetic and biodiversity values. Unlike scenic assessments, assessments of appropriateness address the question "what belongs where?" and work to integrate aesthetic and biodiversity goals rather than to seek absolutes. This concept also ties aesthetics together with land ethics by seeking a harmonious "fit" between human activity and the natural world. Approaches are outlined that suggest how perceptions of appropriateness might be studied and used in the context of ecosystem management practices. Additional thought is given to how researchers and managers can begin to broaden ideas of forest aesthetics over the long term.

Keywords: Scenic beauty, biodiversity, ecological aesthetic, visual management practices, ecosystem management, landscape aesthetic, appropriateness, human-landscape interactions.

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Introduction

As a landscape architect and social scientist, one of my major concerns is how people perceive and relate to landscapes. Researchers and practitioners who share this concern maintain that aesthetics is a primary dimension of people-landscape interactions (e.g., Kaplan and Kaplan 1989). In forests, as in many other environments, people form perceptions of a place based on what they see and experience from an aesthetic point of view. This might especially be the case for those who are there to recreate. Because of its primary nature, aesthetics also can color how other aspects of a forest will be evaluated. For this reason, "visual resource management" has become a critical consideration in managing forests for recreation, timber, and other resource values.

In the eyes of many forest landscape architects, aesthetics has long been thought of as one of the few undebatably "good" purposes for managing forests. Traditional timber, range, game, and water resource management is seen as having utilitarian, commodity-oriented purposes that, if not held in check, can compromise the existence of this higher, better purpose. This elite position, however, is now being challenged by another non-consumptive, nonutilitarian "good," namely biodiversity. Like aesthetics, biodiversity values of forests are getting increased attention from citizen groups, and ecosystem management and new forestry programs are redefining how landscape architects and other professionals think about forest resource management.

But while managing for "white hat" resources is increasingly being looked on as the right thing to do, what happens when forest prescriptions developed to achieve such "goods" conflict with each other? In the case of aesthetics and biodiversity, forest landscape architects and landscape researchers alike are coming to recognize that principles long advocated for enhancing the visual quality of landscapes may conflict with ecosystem management principles for maximizing biodiversity. Are these conflicts resolvable? In this paper I argue they are, but maintain that the way people perceive forest aesthetics -- and the ways in which we as researchers and managers conceptualize, measure, and manage aesthetics -- prevent an easy resolution. After discussing why this is so, I suggest a framework and methods in which aesthetic and biodiversity values might be addressed by researchers and practitioners. These ideas, which center on the contextually-based concept of appropriateness, could offer short-term ways to deal with the fundamental perceptions of resource values. I conclude by suggesting ways to move beyond this approach and towards an ecologically-based aesthetic in our management and research.

"Nature" and Development of the "Scenic Aesthetic"

Our landscape preferences are thought to be influenced by many factors: age (Zube and others 1983), gender (Lyons 1983), ethnicity (Kaplan and Talbot 1988), regionality (Schroeder 1987), recreational activity (Brunson and Shelby 1992a, Ribe 1991a); some researchers even maintain there is an evolutionary basis behind certain landscape preferences (Appleton 1975, Kaplan and Kaplan 1989). But of these factors, our dominant culture and history have played major roles in shaping our preferences for landscapes that are *natural* in character (Cox 1985, Huth 1972, Nash 1982). Our natural landscape preferences grew from a tradition of landscape painting and aesthetic theory that began in 17th and 18th century Europe. As our frontier was tamed and remaining wildlands shrunk in size, Americans began to appreciate nature rather than fear it. Borrowing from the European tradition, our attraction to natural landscapes in the U.S. grew during the romantic and transcendentalist movements of the mid-1800s through landscape paintings of artists such as Frederick Church and Thomas Cole of the Hudson River School; through the writings of novelists, poets, and philosophers such as James

Fenimore Cooper, William Cullen Bryant, and Henry David Thoreau; and through the park and estate designs of Andrew Jackson Downing and Frederick Law Olmsted.

But the landscape portrayed through these media, and preferred by those who increasingly viewed and visited the landscape for recreation, was not so much a natural environment as it was a *naturalistic* interpretation of one. Landscape painters often stylized the nature they saw, carefully composing a scene by adapting formal design principles such as balance, proportion, symmetry, order, vividness, unity, variety in line, form, color, and texture, and others. Subjects were often the dramatic, monumental landscapes of the eastern and western U.S., where mountains and other natural curiosities helped to define the notion of the picturesque. Other subjects emphasized the "softened" wilderness, where human activity harmonized with nature to express a tidy, pastoral quality. These compositional techniques were emulated by landscape designers, who created parks and garden estates that were stylistic renditions of nature as portrayed in paintings. As if looking at a landscape painting, people regarded these environments for their visual scenic and picturesque qualities, and the "scenic aesthetic" became the dominant mode of landscape appreciation (Rees 1975).

The Scenic Aesthetic In Forest Management and Research

The popularization of a landscape aesthetic based on a preference for idealized, naturalistic scenery went far to help define how city parks were designed and which western parcels of land were preserved for national parks and monuments. The scenic aesthetic also became the basis for addressing aesthetics in forest management, although aesthetics did not become an explicit concern in forest landscape planning and management efforts until a century later. Management of large scale forest landscapes for aesthetic values began in earnest in the early 1970s in response to public concern over clearcutting in eastern and western national forests. The USDA Forest Service's "Visual Management System" (1974) and programs of other public agencies were developed to identify aesthetic values in the landscape, define people's sensitivity to landscape change, and set standards for preserving, enhancing, or retaining aesthetic quality and mitigating the effects of landscape development (Smardon 1986).

Like the landscape painters and designers of earlier times, landscape architects who practice visual management use formal design concepts such as variety in line, form, color, and texture to describe and deal with change in the forest landscape. Examples in Forest Service handbooks illustrate how introducing greater variation in corridor edges and in the shape, size, and distribution of clearcuts can help to emulate patterns found in the natural landscape. Following the popular scenic aesthetic, current landscape management emphasizes the visual, stylized design of an ideal nature, rather than one where the dynamics of change are apparent. With considerable landscape management responsibility focused on mitigating the effects of undesirable landscape change, forest landscape architects often use vegetative or topographic screens and other techniques to hide or reduce visual impacts. The "illusions" created by these techniques further the idea that a natural forest is one that is mature, tidy, and unchanging (Wood 1988).

Many research efforts have explored the nature of landscape aesthetics, from both theoretical (e.g., Kaplan and Kaplan 1989) and applied perspectives (e.g., Ribe 1989). Like the visual management practices just described, researchers have tended to focus their attention on the scenic aesthetic, asking people what they perceive to be the "scenic beauty" or "visual quality" of the landscape under study. The scenic aesthetic is conceptualized as a perceptual, affective reaction to the landscape in that viewers are

asked to make a quick evaluation whether they like or dislike a landscape (e.g., Daniel and Boster 1976). These judgments are facilitated through the use of simple rating scales and the representation of landscapes by photographs or slides that allow for the efficient evaluation of many views in a short time (Nassauer 1983). The ratings are often correlated in models with physical, formal design, and psychological landscape attributes to address theoretical and applied problems in landscape aesthetics (Gobster and Chenoweth 1989).

Potential Conflicts between Scenic and Biodiversity Values

Visual resource management practice and research have been enormously successful in addressing landscape aesthetics, highlighting an issue few recognized or had the means to deal with just two decades before. But the scenic aesthetic we have focused on in our research and practice has helped perpetuate a preference for forest landscapes that some have called superficial (Nassauer 1992). By emphasizing the visual, dramatic, and picturesque attributes of nature, by treating the landscape as a static, formal composition, and by conceptualizing and measuring only the visual, perceptual, and affective aspects of human aesthetic response, we may be limiting the range and depth of aesthetic opportunities we afford our public. This is unfortunate in and of itself, but the problem takes on even greater importance when we attempt to provide for biodiversity ***and*** aesthetic values.

Some practices advocated to enhance biodiversity may go against tenets established through practice and research to promote forest visual quality or mitigate visual impacts of forest harvesting. While there are also many instances where practices to meet these goals are compatible with each other or conflicting practices are resolved through interdisciplinary planning team efforts, the four examples below illustrate how potential conflicts between biodiversity and aesthetic goals can occur in important aspects of forest management:

Downed wood -- Slash left from timber harvesting often has one of the biggest impacts on the perceived visual quality of near-view forest scenes (e.g., Brown and Daniel 1986, Ribe 1991b, Vodak and others 1985). Naturally occurring downed wood is often indistinguishable from downed wood caused by logging practices, and thus natural decline visible in mature and old growth stands can have similar scenic impacts (e.g., Benson and Ullrich 1981, Schroeder and Daniel 1981). To reduce these impacts, harvest prescriptions for visually sensitive areas often call for removing, lopping, chipping, burning, or pulling slash back from human use areas. From a forest biodiversity perspective, however, downed wood can be important in maintaining site quality and sustaining soil productivity, the diversity of insects, microfauna and microflora, wildlife food and cover, and tree and groundcover regeneration (Maser and others 1979, Stark 1988). Practices that affect the abundance and distribution of slash and natural downed wood can thus hinder biodiversity goals (Hunter 1990).

Tree size and old growth character -- Large diameter trees and various measures associated with them (e.g., tree age, height, stand basal area) have been strongly linked to visual preferences for near-view and vista-view forest stands (Arthur 1977, Brown and Daniel 1984, Buhyoff and others 1986, Ribe 1991b). Some temporal models of perceived scenic beauty have shown a monotonically increasing relationship between scenic beauty and time since harvest (e.g. Hull and Buhyoff 1986, Ribe 1991b); others suggest that as dominant species in a stand pass maturity, scenic value may begin to decrease due to the presence of naturally occurring standing dead and downed wood (Benson and Ullrich

1981). Although scenic values are often cited along with biodiversity values as important reasons for preserving old growth forests, these mixed results hint that the relationship between scenic value and old-growth character is not as straightforward as the predominance of large trees. According to Hunter (1990): "many old forests are not what the average person would consider beautiful; there may be no huge, magnificent trees; there will certainly be numerous dead and dying ones" (p. 67). In fact, the biodiversity of old-growth forests may have more to do with the dead and dying material they produce than with the large, living trees that remain (Hunter 1990). Some benefits of fallen trees and downed wood have already been mentioned; additional wildlife uses of standing dead trees or "snags" include cavity nesting and den sites, nesting platforms, feeding substrate, plucking posts, food caches, overwintering sites, and roosts, lookouts, and hunting perches (Maser and others 1988).

Silvicultural systems -- Several studies have described the visual effects produced by conventional silvicultural systems such as clearcutting, shelterwood, and uneven-age management (Benson and Ullrich 1981, Ribe 1991b), as well as some "alternative" treatments such as deferment cutting (Smith and others 1989) and techniques advocated by new forestry (Brunson and Shelby 1992b). Visual preferences usually coincide with the perceived degree of disruption; "unmanaged" forests are most preferred, and clearcut areas are least preferred. Several studies, however, have shown that lightly managed stands in which dead material and low tree and shrub cover are reduced, and visual penetration is increased, are often preferred to unmanaged stands (Brush 1978, McCool and Benson 1988, Patey and Evans 1979, Ruddell and others 1989). From a biodiversity standpoint, even- and uneven-age management techniques that promote a tall and varied vertical structure may encourage higher biodiversity (Hunter 1990). In this light, techniques that reduce structural heterogeneity -- e.g., the prototypical park-like stand of mature trees with an herbaceous groundcover but little mid-level vegetation -- may be scenically popular but could compromise biodiversity goals.

Clearcut size, shape, and distribution -- Despite the wide use of even-age management techniques and their disruptive effects on scenic quality, few researchers have looked at people's perceptions of various methods for reducing visual impacts. Common sense would assume that smaller clearcuts would be preferred to larger ones, and some research indicates that this is the case (Schroeder and others 1993). Ruddell and Hammitt (1987) also found visual preferences for well-defined edges in forest recreation settings. Certainly forest policy and established visual management practices have tended towards smaller clearcuts and varied shapes to decrease their noticeability in the landscape (USDA Forest Service 1974). Likewise, corridor planning techniques often focus on increasing the vertical and horizontal edge variety between forest and opening, to reduce contrasting lines and emulate natural openings (USDA Forest Service 1980). Treatments like this can enhance habitat for many edge species such as deer and ruffed grouse (Brenneman and Eubanks 1989), but can endanger forest flora and fauna that rely on interior forest conditions (Robbins 1979). When the amount of edge is increased, forest interiors can be more easily invaded by weedy plant species and predators, which can displace or outcompete native species. Likewise, increasing forest fragmentation can reduce overall species diversity and diversity of old growth species, and it can make interior stands susceptible to pathogens, wildfire, and windthrow (Franklin and Forman 1987).

An "Ecological Aesthetic" as a Solution to the Conflict?

These four examples illustrate how visual management practices may work at cross-purposes with biodiversity goals. Can conflicts between aesthetics and biodiversity be resolved? Some believe they can, but maintain that to do so we as forest users, managers, and researchers need to adopt a different way of thinking about the aesthetics of forest landscapes. As a mode of landscape appreciation, the scenic aesthetic might function well for some types of open spaces -- parks in particular -- but for landscapes where ecological values are a primary consideration, we must go beyond the superficial to a deeper understanding and appreciation of nature. Ideas about this aesthetic-- an "ecological aesthetic" as some have called it -- stem largely from a series of essays by Aldo Leopold, culminating in his *Sand County Almanac* (1949). Although Leopold never explicitly outlined his ecological aesthetic, its elements are synthesized by Susan Flader and Baird Callicott in their compilation of Leopold's writings, *The River of the Mother of God* (1991):

> By contrast [to the scenic aesthetic], in Leopold's revolutionary land esthetic all the senses, not just vision, are exercised by a refined taste in natural objects, and esthetic experience is as cerebral as it is perceptual. Most important, form follows function for Leopold as for his architectural contemporaries. For him, the esthetic appeal of the country, in other words, has little to do with its adventitious colors and shapes -- and nothing at all to do with its scenic and picturesque qualities -- but everything to do with the integrity of its evolutionary heritage and ecological processes (p. 9-10).

Using Leopold's writings as a starting point, I have summarized the elements of an ecological aesthetic in table 1, and contrasted them with the elements of a scenic aesthetic. I have added points from others in the fields of design, ecology, psychology, and philosophy, and have presented them within a framework adapted from Zube and others (1982) to describe the "landscape perception process." This framework, useful for helping to organize and identify elements of an ecological aesthetic, is divided into sections pertaining to the individual, the landscape, the human-landscape interactions that take place, and the outcomes or benefits that result.

A cursory comparison of elements in the table shows the fundamental differences between the two aesthetics. For one, an ecological aesthetic requires us to redefine how we "see" the landscape and our place in it. In the scenic aesthetic, the pursuit of pleasure (affect) is primary, and pleasure can be derived from viewing the landscape irrespective of the ecological integrity of that landscape. In contrast, in an ecological aesthetic, pleasure is a secondary outcome that derives from knowing about the landscape and knowing it is ecologically "fit." This difference changes the focus of our relationship with the landscape from a homocentric one towards one that is more biocentric. In the context of aesthetics, Rosenberg's (1986) idea of "ecological humanism" may be a more appropriate conceptualization of this relationship, where "the needs of humans and the needs of the environment *converge*" (p. 79). This ties aesthetics together with ecology and with ethics, as expressed in Leopold's (1949) land ethic: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (p. 224-5). This change in focus also changes our idea of perception from a process that is visual, immediate, and largely affective to one that demands engagement of all of our

Table 1-- Some elements of scenic versus ecological aesthetics

Scenic	Ecological	Selected references
	Person-related elements	
Perceptual, immediate, affective/emotional	Cognitive, knowledge based, "a refined taste," in addition to affective	Zajonc 1980, Zajonc & Markus 1982, Leopold 1949, Carlson 1979, Thayer 1989
Limited to visual sense	All senses engaged -- sight, hearing, smell, touch, taste as well as movement/ exploration	Zube et al. 1982, Leopold, 1949, Thorne & Huang 1991, Gibson 1979, Hevner 1937
Popular taste, "lowest common denominator"	Elitist?	Carlson 1977, Ribe 1982
View of world is homocentric	View is biocentric, ethical "ecological humanism"	Rosenberg 1986, Leopold 1949
	Landscape-related elements	
Visual, focused	Multimodal, ambient	Spirn 1988, Zube et al. 1982
Static, inanimate, fixed	Dynamic, living, changing	Spirn 1988
Formal elements, pastoral, picturesque	Form follows function, vernacular	Nassauer 1992, Hunter 1990, Carlson 1979
Dramatic	Subtle	Leopold 1949, Callicott 1983
Naturalistic	Natural	Nassauer 1992
Taken at face value	Symbolic, deeper meaning	Laurie 1983, Howett 1987
Bounded, framed, specific places	Unbounded, entire forest	Hepburne 1968
Composed view	Aesthetic "indicator species" in intact ecosystem	Callicott 1983
Tidy, pristine	Messy	Hunter 1990, Nassauer 1988
	Interaction-related elements	
Passive, object-oriented, stimulus-response	Active, participatory, experiential	Chenoweth and Gobster 1990, Koh 1988, Thayer 1989
Accepted as a given	Invokes a dialogue	Spirn 1988
	Outcome-related elements	
Pleasure	Understanding and pleasure	Thayer 1989
Observation	Action and involvement	Zube et al. 1982
Short-term, mood changes	Long-lasting, restorative, deep values, unity, identity, sense of place	Dwyer et al. 1991, Spirn 1988, S. Kaplan 1993
Maintains status quo	Catalyst for internal and external change	Spirn 1988

senses as well as our intellect to "see," as Leopold (1949) writes, "[beyond the pretty] ... through successive stages of the beautiful to values yet uncaptured by language" (p. 96). With respect to public land management, some might think such an approach to be elitist, while others have argued that to manage only for popular taste reduces what is deemed of value to the "lowest common denominator" (Carlson 1977).

The things we "see" in the landscape also change as we shift focus from a scenic to an ecological aesthetic. The dramatic, visual elements of the picturesque continue to give aesthetic pleasure, but so do the more subtle and ordinary landscapes of forest ecosystems. The beauty of these places, however, often requires deeper exploration of their qualities; appreciating the landscape's extra-visual properties as well as the dynamics of change often takes precedence over viewing the landscape as if it were a static composition. In ecological aesthetics, pleasure is derived from knowing how the parts of the landscape relate to the whole -- for example, how the presence of aesthetic "indicator species" (Callicott 1983) like the Kirtland's warbler, eastern timber wolf, and northern spotted owl is sustained in an intact ecosystem. These features imbue the forest landscape with deep, symbolic meaning, whereas the composed view is often appreciated at face value.

The last two parts of the table distinguish the interactions between humans and the landscape, and the outcomes that result. Having an ecological aesthetic requires that we experience the landscape as active participants -- not watch it passively as if it were a picture or other art object, but relate to it as a living landscape. It is through these interactions that we develop "dialogues" with ourselves and with the landscape that help us, as Spirn (1988) suggests, know ourselves and our place in the world. Although "snapshot" experiences of pretty landscapes may be sufficient to temporarily alter moods in a positive way, extended dialogues with nature facilitate psychological restoration and allow opportunities for inner change (S. Kaplan 1993). Spirn (1988) describes some of these benefits in the context of design; the same can be said in appreciation of biologically diverse natural and managed forests:

> Design which highlights nature's processes for our contemplation permits the experience of a sense of unity with a larger whole which is the universe in which we live... Design that fosters and intensifies the experience of temporal and spatial scales facilitates both this reflection upon personal change and the search for identity and sense of unity with a larger whole. Design that resonates with the natural and cultural rhythms of a place, that echoes, amplifies, clarifies, or extends them, contributes to a sense of rootedness in space and time" (p. 109-110).

If we look at these differences from a management perspective, an ecological approach to aesthetics could help resolve many of the conflicts that now occur when managing for scenic aesthetic and biodiversity values. From the public's perspective as well, substantial individual and societal benefits could be gained if people adopted an ecological aesthetic to landscape appreciation. But is the public ready to appreciate new forestry sites that feature exploded tree tops, tall piles of slash, or 900-acre clearings? With a 200+ year history of evolution, adherence to the scenic aesthetic is ingrained, and the changes required for adopting an ecological aesthetic are fundamental. What, then, should be the strategy for resolving or at least minimizing conflicts between aesthetic and biodiversity values?

Appropriateness Analysis

The concept of appropriateness could offer a viable short-term strategy for considering publicly held aesthetic and biodiversity values. Appropriateness refers to the judged suitability or compatibility of an introduced change, relative to one or more management goals. In the context of this discussion, management goals include the protection of aesthetic and biodiversity values. Expanded applications might incorporate additional goals, including utilitarian ones. The purpose behind such an analysis would be to obtain a more holistic, publicly based resource evaluation than is available through traditional, single-issue assessments. The term "appropriate" is thus used in a perceptual sense (i.e., perceived appropriateness), and does not imply that current practices are inappropriate.

As a psychometric approach to assessing public perceptions, evaluations of appropriateness differ from evaluations of scenic preference in several important respects. First, evaluations of appropriateness are *integrative* in that they merge ideas about aesthetics and biodiversity within a single problem focus, namely that of management change. This changes the nature of the question from one of *if* change should or should not occur to *how* change can best be managed to provide for multiple values.

Integrating concepts within an appropriateness framework helps to avoid the incompatibilities that might occur when dealing with them singularly. The conflict between these concepts is illustrated in figure 1, where six hypothetical forest stands are rated for scenic and biological quality. The "old growth" and "new forestry" stands receive high marks for their biological quality, but look messy because of dead and downed wood and thus are rated low in scenic quality. In contrast, the "pastoral park" and "naturalistic pine grove" look scenic, but lack structural and plant species diversity and thus receive low marks for biological quality. The two stands on which there is agreement are the "uneven-aged" stand with big-tree character that has both beauty and diversity, and the "recent clearcut" that lacks both scenic and biological quality.

Figure 1 – Biological and scenic quality ratings for six hypothetical forest stands.

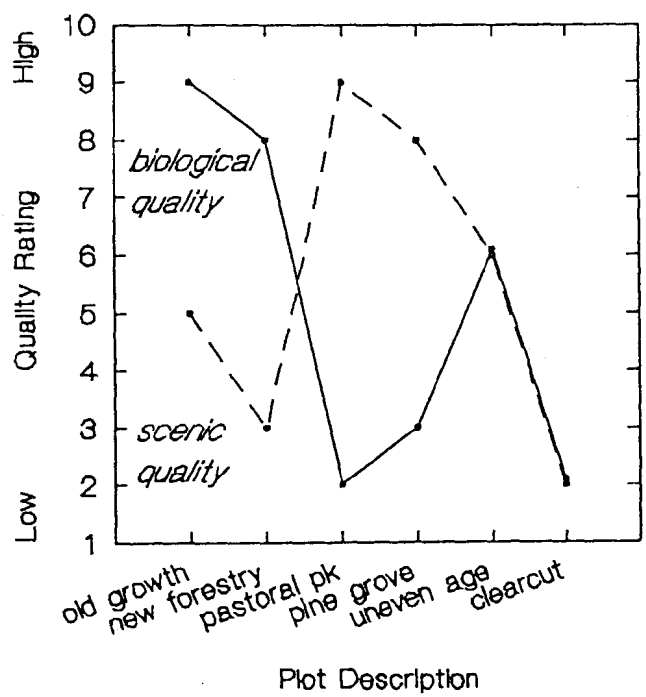

Figure 2 shows how these two disparate values are brought together in an evaluation. But it also illustrates a second major way in which evaluations of appropriateness differ from traditional assessments of scenic preference: evaluations of appropriateness are ***contextual*** in nature. Perceptions about the appropriateness of change depend upon knowledge about the nature of the setting and/or situation in which that change is to occur. The contextual nature of land use has long been recognized in city planning and zoning, where ordinances are enacted to ensure that the function, use, and design of adjacent developments are compatible with each other. Contextual compatibility has been a topic of research in urban architectural psychology (e.g., Groat 1984), and has received some attention with respect to the development of natural landscapes (e.g. Gobster 1983, Wohlwill 1979). Context is also an integral component in some recreation planning systems such as the USDA Forest Service's Recreation Opportunity Spectrum, or ROS (USDA Forest Service 1986), where criteria for size, remoteness, degree of development, and other factors are used to identify the ROS settings appropriate to providing desired recreation experiences.

Figure 2 – Appropriateness ratings for six hypothetical forest stands in "Urban," "Roaded Natural," and "Semiprimitive" ROS settings.

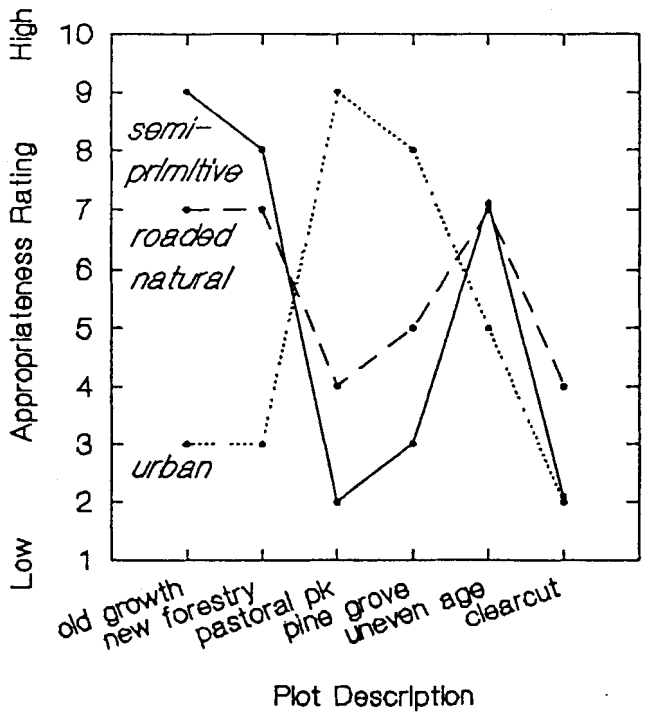

Figure 2 shows the same six hypothetical forest stands, rated this time for the appropriateness of the management practice in each of three ROS settings: "urban," "roaded natural," and "semiprimitive." Clearly specifying the management objectives of each of these areas, one might hypothesize the appropriateness values to vary by setting in the ways illustrated. In the urban setting, human concerns for scenery might take precedence over biodiversity values, favoring the park and pine grove stands as most appropriate, with other plots perceived as less appropriate. In the roaded natural setting, the uneven-aged stand might be rated as most appropriate; in the semiprimitive setting,

the old growth and new forestry plots might be most appropriate. Appropriateness of the clearcut would depend on its design and the specific management objectives, and might be appropriate in the semiprimitive or roaded natural setting. The examples illustrated by the figures are overly simplistic, but nonetheless show how biodiversity and aesthetic values differ and how conflicts might be resolved by looking at people's ideas of "what belongs where."

Finally, assessments of appropriateness are *external* in nature in that a person makes an evaluation on the basis of what he or she feels is appropriate to reach the stated management goal, rather than on what he or she prefers. This brings the assessment out of a context that is affective, perceptual, and subjective (i.e., "I like") and into one that is more cognitive, information-based, and objective (i.e., "what is right"). In this way, the concept of appropriateness also ties aesthetics together with land ethics and stewardship by seeking a harmonious "fit" or congruity between human activity and the natural world. This contrasts with the concept of acceptability, which seems more human-centered, and implies the setting of standards of minimum adequacy, or limits to admissible, tolerable, or permissible change. This semantic difference may seem slight, but it does cast the nature of the decision/ evaluation in a philosophically different light.

Operationalizing the concept of appropriateness for research and management applications would be a major task. However, good models exist in the fields of visual assessment and recreation research and management that could be adapted to the idea of appropriateness. Specifying the nature of the judgment to be made and the context in which it would be made is critical, and in both cases the success of the assessment relies on the presence of objective, unbiased information. In a research application, public participants would first need to become familiar with the concepts and goals of biodiversity and visual resource management, and with the techniques or practices used to achieve management goals. This might require presentation of information before any site or stand evaluations. Additionally, participants must be aware of the context in which the practices are to be applied, including the ecological capability and uniqueness of the site and its importance to users for visual and recreational purposes. This information could be made available through an Ecological Classification System (Kotar 1988), ROS setting maps (USDA Forest Service 1986), and sensitivity maps completed under the Visual Management System (USDA Forest Service 1974). For some national forests, this information is currently available forest-wide, while in other cases it would need to be created as part of the research application.

After digesting this information, participants could then view sites under study and evaluate them for the appropriateness of the management practice. Gobster (1983) demonstrates one application of this method in evaluating the appropriateness of residential development in "wild," "natural," "recreational," and "urban" lakeshore settings. In that study, written statements and photographs were used to depict the setting to study participants, who then rated the perceived visual appropriateness of development in each of the four settings for alternative sites as shown through color slides. More realistic portrayals of alternatives could be accomplished with on-site visits, as used by Brunson and Shelby (1992b) in their study of the acceptability of new forestry sites. Evaluations as well could be enriched by including open-ended questions or focus group discussions of the alternatives along with standard, rating scale data. Ultimately, this information could help to identify and model the effects that specific management attributes have in

predicting appropriateness, and in determining how perceptions of appropriateness vary as a function of context.

Table 2-- Some tentative criteria for defining appropriate forestry management practices with regard to aesthetics and biodiversity

Appropriateness criteria	Context-- ROS settings		
	"Urban" (e.g. modern campground)	"Roaded Natural" (e.g. dispersed recreation)	"Semiprimitive" (e.g. backcountry wildland)
	Management emphasis		
Management goal	Scenic or "contained biodiversity"	Balanced	Biodiversity
Use orientation	Human/aesthetic	Balanced/multiple use	Ecological
	Management change		
Change from current practices	Low	High	Low
Scale of change	Small; demonstration patches	Medium	Large
Duration	Short- to long-term	Medium	Long
Visibility	High	High	High
Sustainability	High	High	High
	Expression to public		
Information	High; on-site	Low on-site, high off-site	High; off-site
Landscape design cues	Many; care as neatness; picturesque conventions	Some; care as stewardship	Few; care as ecological integrity

A system to identify and manage for appropriateness could be built along these same lines, using information from user and interest group evaluations either as a starting point, or later, as a means to validate a model. Like the research application described above, the management context and objectives could be defined using existing Ecological

Classification System, ROS, and Visual Management System information. Stankey and others (1985) lay out a comprehensive process for defining "limits of acceptable change," which also could be fruitfully adapted to such an assessment. Perhaps within a GIS environment, areas of high scenic and biodiversity value could be overlaid with each other and with recreation setting and visual sensitivity maps to identify areas geographically. From such analyses, a set of criteria could be developed to spell out management goals and applications within different contexts. A preliminary outline of these criteria is shown in table 2.

The table lists criteria for "management emphasis," "management change," and "expression to the public" for each of three ROS settings. In an "urban" context (e.g., a modern campground) where large numbers of users are concentrated for extended periods of time, the management emphasis would be on human enjoyment, and would attempt to achieve scenic beauty in the traditional sense. This emphasis would change as one moves across the ROS. In "roaded natural" settings, areas seen by moderate numbers of users who drive through or use such settings for dispersed recreation, scenic and biodiversity goals would be balanced. And in semiprimitive areas used by low numbers of people for nature-oriented recreation, the emphasis would be on biodiversity and maintenance and enhancement of ecological processes. Management changes in urban settings would not deviate much from current practices, and changes made to maintain or enhance biodiversity would remain subordinate to the retention of scenic quality. As Hobbs (1988) suggests, attempts to enhance biodiversity in urban areas might take the form of small scale demonstration projects geared more to educating the public than to maintaining or reproducing high quality ecosystems. The biggest changes might occur in roaded natural settings, where practices to maintain and enhance biodiversity would have greater visibility than under current visual management objectives. For example, slash piles and snags might be more visible, clearcut edges might be less undulating, and the scale of landscape alterations might be larger than if visual management were a primary criterion. In semiprimitive areas, scale, duration, and visibility of changes could be greater still, but current visual management practices might remain close to what is now permissible for areas of low visual sensitivity. In all settings, management changes introduced to enhance biodiversity and scenic quality should be sustainable in that they are in tune with the ecological constraints of the site and tend towards a dynamic equilibrium over the long term.

Perhaps the most important criteria in table 2 are those that help define how ecosystem management practices are expressed to the public. Information plays a key role in all settings because public perceptions of appropriateness depend on knowledge of the purposes behind the management change (Thayer 1989). This information must be conveyed sincerely and objectively to avoid suspicion that managers are trying "to fool the public" (Wood 1988). In urban settings, interpretive nature trails, kiosks, ranger programs, and other kinds of on-site information can all aid communication efforts. Off-site information may be a more appropriate way to communicate to users of roaded natural and semiprimitive areas, though unobtrusive signage can be effective (USDA Forest Service 1986).

Along with information, landscape design can offer important ways for telling the public why enhancing biological values is important. Evidence of human care, Nassauer (1992) maintains, acts as cues for interpreting the intentions behind ecologically sustainable landscape practices that otherwise might appear messy and "unnatural." In urban

settings, these cues might include picturesque conventions that portray a diverse and sustainable landscape, albeit a landscape that is neat and tastefully designed. For example, a winding, well-maintained nature trail might be located near a high-use forest campground to show visitors the biological diversity of an uneven-aged stand. Trail layout and trailside vegetation might be selected to highlight a few larger or peculiarly shaped trees, to favor fall color, or to increase the variety in height and texture contrasts. In some cases, compatible understory, midstory, or overstory vegetation might even be planted to enhance picturesque effects. Brushpiles, snags, and other treatments that would usually be concealed in the visual management of urban areas might instead be highlighted by framing them with attractive vegetation and including interpretive signage, again to portray the intentions behind the practices. In roaded natural settings, fewer picturesque conventions might be used, or replaced by less stylistic cues that still help convey land stewardship. For example, a self-guided "ecosystem management auto tour" might be designed, where a slightly wider mowed right-of-way or pull-off would set off the land practice, and a brochure and marker sign would describe its function and purpose. In the national forests, such a tour could be incorporated within the framework of the Scenic Byways program, expanding the concept of this already successful means of public communications. Cues in semiprimitive areas might be subtle or missing altogether--perhaps unobtrusive marker posts in representative areas, keyed to a brochure available off-site. For these sites, care is exhibited by ecological integrity and largely up to forest users to discover it.

Conclusion

Appropriateness analysis offers a potentially promising way to reconcile conflicts between aesthetic and biodiversity values. However, it is a short-term fix that sidesteps fundamental problems in the way we think about and deal with aesthetic issues in forestry. Failing to address these problems will perpetuate the conflict, and compromise ecosystem management as an approach to effectively serve the best interests of the public and the environment.

Toward Adoption of an Ecological Aesthetic

Changing the situation calls for no less than changing our perception of the aesthetics of forest landscapes. This task is difficult but not impossible, and there is evidence that aesthetic ideas about landscapes can evolve when guided (or forced) by agents of change. One case in point has been the rise in popularity of "xeriscaping" in the Southwestern U.S. A decreased reliance on shade trees for cooling, combined with water shortage threats, has increased the popularity of arid-adaptive landscape design in Tucson and other urban centers. According to McPherson and Haip (1989): "Once the change began, the rapidity of its acceptance was striking. This rapid shift from horticultural to desert landscape illustrates how strong sociocultural traditions like a grassy front lawn can be modified if people are presented the right combination of incentives, mandates, and educational materials" (pp. 447-8). A second case was in the interpretation of the wildfires that moved through Yellowstone National Park during the summer of 1988. Initially, the fires were presented as a disaster of great proportions, but later reports in such popular magazines as *National Geographic* communicated the valuable benefits and beauty resulting from the fires (Jeffery 1989).

Landscape architects and other resource managers need to act like similar agents of change to move the public towards adoption of an ecological aesthetic for forest management. By understanding the ideas of ecological aesthetics and how they differ from scenic aesthetics, managers and planners can begin to think in different ways of how to design and portray ecosystem management practices to the public. Programs,

materials, and on-site experiences can help acquaint people with the multisensory, dynamic qualities of a biologically diverse forest, and show how places that may at first glance appear messy and uncared for can yield deeper aesthetic values upon closer inspection. First and foremost, however, if ecosystem management is to become the driving paradigm behind landscape management of national forests and other areas, managers need to portray, interpret, and even celebrate change rather than conceal it. Showing this change to the public through landscape design and through information was discussed previously (in the section on appropriateness analysis); these same guidelines hold true as applied to ecological aesthetics. In this light, we should also recognize that scenic aesthetics has a proper place in forest management, and management practices should be sensitive to the settings to which they are applied.

Researchers, too, must play an integral role in deepening our understanding of ecological aesthetics. We must expand our repertoire of methods to identify the full spectrum of aesthetic values, to move out of the laboratory and beyond studies of visual preferences for photographic surrogates, and move into field studies where we can uncover the subtle, symbolic, and deeper values of ecological aesthetics. Studies of hunters, birders, native plant enthusiasts, and others who have an intimate knowledge of natural environments would help us to understand how "a refined taste for natural objects" (Leopold 1949) is acquired, and how ecological beauty is "seen" by people. In a study of aesthetic experiences in natural landscapes (Gobster and Chenoweth 1990), we developed and refined our research instrument (questionnaire) using a focus group methodology. This qualitative research method yielded many important insights into the nature of aesthetic experiences, as did Nassauer's (1988) use of in-depth interviews in understanding people's perceptions of landscape care. Such techniques could be fruitfully applied to an analysis of ecological aesthetics. Transferring this information into specific guidelines for forest management and planning is not always possible, but such knowledge can help us understand how people value and interact with forest environments.

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Defining Social Acceptability in Ecosystem Management: A Workshop Proceedings

Kelso, Washington
June 23-25, 1992

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Abstract

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This compendium of papers was developed in response to the assumption that implementing an ecological approach to forest management requires an understanding of socially acceptable forestry -- what it is and the implications of doing it. The papers in this collection bring to bear perspectives from a variety of social science disciplines and question whether the focus on social acceptability is an appropriate and useful one.

Keywords: Ecosystem management, social acceptability, environmental ethics, social values, landscape aesthetics, public participation.