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Toward an integrative theory of environmental aesthetics

Hetherington, John Drew, Ph.D.

The University of Arizona, 1992

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Toward an Integrative Theory of Environmental Aesthetics

by

John Hetherington

A Dissertation Submitted to the Faculty of the

DEPARTMENT OF PSYCHOLOGY

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Final Examination Committee, we certify that we have read the dissertation prepared by JOHN HETHERINGTON

entitled TOWARD AN INTEGRATIVE THEORY OF ENVIRONMENTAL AESTHETICS

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I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

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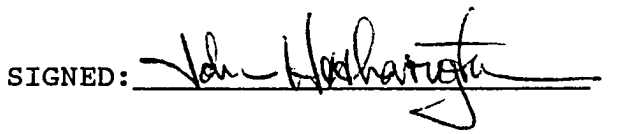
SIGNED: 

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A man alone is in bad company.
Paul Valéry (1924)

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Dedication

This manuscript is dedicated to Maxwell P who, like myself, was always better at dreaming than doing.

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Abstract

A number of different methods for assessing the aesthetic quality of environments have been developed over the past 30 years. From methods that rely upon "experts" to judge the scenic quality of a landscape to methods that rely upon "naive" observers, all methods share the same basic interest: To explain or predict aesthetic quality between different environments. Although a number of attempts at integrating different methodologies have been recently reported, these have failed to produce an integrative theory of environmental aesthetics due to experimental and theoretical problems inherent in each design. The present study was designed to derive fundamental aesthetic principles for landscapes through the integration of the formal aesthetic, psychological, and psychophysical methods. This study addressed three basic questions: (1) What traits or constructs are being measured by environmental assessment methods currently used?, (2) Are these constructs independent of the methods used to assess them?, and (3) Can an integrative theory of environmental aesthetics be developed empirically? To answer these questions, the study focused on the construct validity of the measures within each method across four different landscapes, ranging from Alaska to the Southwest. Three categories of ratings were

collected for each landscape, corresponding to the published procedures of each method. Initial factor analyses were run within each method across the four landscapes to determine what general environmental characteristics were measured by each method. A second-order factor analysis was used to derive basic aesthetic characteristics which transcend both method of measurement and landscape type. Multiple regression analyses were then used to predict the common aesthetic characteristics from the physical data of the landscapes. The experiment was designed to facilitate a new understanding of (1) whether universal principles of aesthetic quality exist across different environments and methods of assessment and (2) if physical measures of the environment can be used to predict those universal characteristics.

> Isn't flame mysterious because it is impalpable? All right--but why does that make it mysterious? Why should something impalpable be more mysterious than something palpable? Unless it's because we *want* to catch hold of it.
>
> Ludwig Wittgenstein
> Zettel

Aesthetics

It is the ethereal quality of the aesthetic experience that has for centuries fascinated philosophers and scientists alike. What qualities are being valued when aesthetic judgments are made? How are aesthetic judgments formed and then expressed? Does an absolute standard of beauty exist? If so, is it knowable? The difficulty in answering these fundamental questions is in part the perpetual attraction of investigating aesthetics.

The importance of aesthetics to human civilization has been long recognized by scholars (e.g., Pickford, 1972). In fact, anthropologists demarcate the emergence of modern *homo sapiens* 30,000 years ago by noting the development of elaborate behavioral and social systems, chiefly rock art and cave paintings (Pilbeam, 1989). In modern history, however, two distinctive approaches toward investigating aesthetics have emerged: speculative and empirical. Speculative aesthetics involves theoretical or artistic reflection by either philosophers or artisans, while

empirical aesthetics entails controlled observation of stimulus and response by behavioral scientists (Berlyne, 1974). Although investigated with different methods and guided by different goals, both approaches seek to explain and understand the possible range of human aesthetic experience.

For speculative approaches, the importance of aesthetic[1] theory in philosophy is indicated by Plato's inclusion of it as one of the three principal components of traditional philosophy: Truth, Goodness, and Beauty. Another indication is the abundance of philosophical theories regarding the nature of beauty and the experience of the same. From classical philosophers like Plato, who considered beauty to be determined by both measure and proportion, to medieval philosophers like St. Augustine, who characterized beauty in terms of unity, number, equality, proportion, and order, an explanation of the aesthetic experience has been offered by most of the great thinkers in recorded history.

Although history has produced a number of philosophical or artistic treatises on what is beautiful or aesthetic, these speculative theories are fundamentally idiosyncratic. Philosophical arguments may be constructed from acceptable

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[1]The word "aesthetic" is derived from the Greek verb *aesthanesthai*, which means "to perceive" (Berlyne, 1974).

general premises and impeccably employed symbolic logic, but they essentially still reflect one person's opinion regarding aesthetic quality. If one is interested in answering basic or practical questions regarding aesthetics, philosophical normative theory has little to offer. As a result, one must seek other methods to examine the nature of aesthetics.

A number of scholars, dissatisfied with philosophical approaches to aesthetics, have employed scientific or empirical methods to investigate aesthetics. Measurement of aesthetics via expressed preferences has had a long history in the domain of psychology, with the first experiments conducted by Gustav Fechner, father of psychophysics and experimental psychology, in 1876. It was Fechner's belief that fundamental principles of aesthetics could be discovered factually, rather than based on philosophical argumentation. Indeed, Fechner developed the method of paired comparisons specifically to measure preferences for colors, figures, and works of art (Gregory, 1987).

Although research in aesthetic judgments and preferences progressed lethargically after Fechner's death, experimental psychologists resumed work in aesthetics during the 1930s and 1940s (e.g., Eysenck, 1942). Investigations regarding artistic perception, cultural and racial differences, and artistic styles are some examples of

research topics that illustrate the initial concerns of the psychological approach to visual aesthetics (Pickford, 1972). However, this period of resurgence in experimental aesthetic research witnessed investigators who did not attempt to develop universal aesthetic principles, and who consequently were content to simply report empirical results of particular circumstances.

A theoretical framework (which later evolved into a significant empirical program) of aesthetic experience was eventually published by David Berlyne (1960) in Conflict, Arousal, and Curiosity. Berlyne postulated the existence of certain attributes of visual stimuli that elicit certain psychological responses. Examples of these properties include the complexity, novelty, surprisingness, incongruity, and ambiguity of the stimulus. These attributes initiate either exploratory or investigatory behavior of the subject as a result of the uncertainty regarding interpretation of the stimulus (Wohlwill, 1976). In other words, the more complex, novel, surprising, incongruous, and ambiguous a stimulus is, the more difficult it is to interpret by a subject, and it thereby motivates or arouses a subject to either investigate or explore a stimulus further in an attempt to reduce such uncertainty.

A second central concept in Berlyne's theory of aesthetics is a distinction between specific and diversive

exploration. Specific exploration refers to activities which seek to reduce a present high level of arousal or uncertainty, while diversive exploration seeks to increase the uncertainty or arousal beyond a currently low level of stimulation (Berlyne, 1963). If the level of arousal for a particular stimulus is too high, specific exploration seeks to reduce the arousal to an "optimum" level of stimulation. If the level of arousal for a particular stimulus is too low, diversive exploration seeks to increase the level of arousal to an "optimum" level of stimulation.

Berlyne (1963) subsequently developed a method specifically designed to investigate attitudes concerning exploration. Subjects were presented with pairs of stimuli (either artificial or artistic), and were asked which of the two they wish to see again. Using the results of this study in conjunction with other research (e.g., Berlyne, 1974; Crozier, 1974), a number of factor analyses were conducted which consistently yielded two factors: Uncertainty-arousal and hedonic tone. Berlyne (1974) argued that both of these dimensions act in concert, and ultimately result in one's aesthetic experience.

Although criticized as being too parsimonious,[2] Berlyne's aesthetic theory has significantly influenced psychological research in aesthetics (Pickford, 1972). The field of traditional aesthetic research, which has typically concentrated on aesthetic judgments of or preferences for art, is historically important because it provides both a theoretical and empirical starting point for subsequent inquiries in aesthetics.

Environmental Aesthetics

An intriguing field of inquiry ignored for years by aesthetic philosophers and psychological researchers alike is the study of the aesthetics of the molar environment. The aesthetic quality of both urban and natural environments has proven to be a field of active investigation over the past thirty years (Zube et al., 1987). Like traditional aesthetic research, the study of environmental aesthetics is based on the assumption that general or universal principles of aesthetic quality can be empirically discovered (Wohlwill, 1976).

Since the 1960s, two underlying trends have emerged in the measurement of the aesthetic quality of natural environments: Expert-based and observer-based (Porteous,

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[2]The most poignant of these being Wohlwill's (1976) comment, "This two factor formulation certainly fails to do justice to the complexity of aesthetic judgments" (p. 43).

1982; Zube et al., 1982; Daniel & Vining, 1983). Expert based systems employ individual trained observers to judge aesthetic quality based on design criteria (Litton, 1968, 1972). In this system, aesthetic quality is considered to be different from personal opinion; that is, it is based on *a priori* "artistic" factors which allow critical evaluations of landscapes. These criteria are fundamentally abstract, and proponents of this measure have argued that the criteria transcend different environments, individuals, and cultures (Daniel & Vining, 1983).

Observer-based systems employ naive observers to judge the aesthetic quality based on some scaling procedure. This perspective relies upon ratings or evaluations of "perceived" beauty or quality (Zube et al., 1982; Daniel & Vining, 1983). Such judgments are necessarily subjective, and therefore researchers are relegated to inferring environmental beauty or quality based on behavioral expressions of these perceptions. Ratings of aesthetic quality used in these measures are usually correlated to quantified factors of the environment (e.g., biophysical) or other psychological ratings in an effort to explain the perceived aesthetic quality.

The resemblance between Berlyne's distinction of speculative and empirical aesthetics and the current

distinction of expert-based and observer-based should not be overlooked. Just as with speculative aesthetics, expert-based inquiries rely upon philosophical or artistic reflection. Empirical aesthetics, like observer-based inquiries, employ observation of human behavior to different stimuli. The common link between both approaches is that each endeavors to discover universal principles of aesthetic quality and to summarize such principles in a concise theory of aesthetics.

Theories of Environmental Preference

The development and function of theory has been of considerable concern throughout much of the history of the scientific method. How theories should be developed, stated, employed, and tested are all important issues reflecting scientific progress (Lakatos, 1978; Mayr, 1987). How scientists choose between comparable theories has also been a topic of substantial consideration (e.g., Kuhn, 1969; Laudan, 1984). Proposed criteria for the evaluation of theories have included the ability to predict relationships between phenomena, the ability to parsimoniously summarize large amounts of data, the applicability or generalizability of theory to different phenomena, the ability to generate additional research by suggesting novel relationships and the ability to apply subsequent research to practical problems (Kerlinger, 1973; Nunnally, 1978).

However, one issue in particular is essential to understanding the limitations of current environmental aesthetic theories. Generally, theories can be evaluated in relation to one another by considering the breadth of phenomena explained or scope of a theory. In other words, if one theory can sufficiently explain the domain of another theory, the former is considered to be better than the latter (Petrinovich, 1979; Muliak, 1988).

A number of theories regarding aesthetic quality for environments have been offered over the years in environmental aesthetics: Formal aesthetic, phenomenological, cognitive, and affective (Zube et al., 1982; Daniel & Vining, 1983). However, these theories are method specific and are not considered to be integrative in the sense that they attempt to explain phenomena outside the realm of the particular method from which each developed (Zube, 1984; Gobster & Chenoweth, 1989). Hence, none have attempted to conceptually explain the results of other methods or the domain of other theories, which is why they will be referred to as "method" specific.

Although usually not explicitly presented as a theory of environmental aesthetics, the formal aesthetic method (Litton, 1968) does imply an underlying theory able to explain and predict aesthetic quality. This theory proposes the existence of formal, abstract properties that contribute

to the experience of aesthetic quality. Examples of these "artistic" properties include basic forms, lines, colors, and textures, which are judged by trained experts in design-related fields. Judgments of these criteria are not considered to be opinions, but reflections of the aesthetic quality of the environment (Litton, 1968).

Although asserted to be universal, the "artistic" properties of the formal aesthetic theory are, like the many philosophical or speculative theories of aesthetics, idiosyncratic. Rather than empirically investigate the nature of the aesthetic experience, the formal aesthetic theory legislates by fiat what aesthetic quality is. Hence, the formal aesthetic theory is generally not considered to be integrative, nor does it attempt to explain phenomena in other empirical or theoretical work (Porteous, 1982).

The prospect-refuge theory offered by Appleton (1975, 1984) is another example of environmental aesthetic theory. Based on phenomenological investigations, Appleton proposes that landscapes which afford an opportunity to observe (i.e., prospect) while the viewer cannot be observed (i.e., refuge) are preferred. Hence, Appleton (1975) associates aesthetic preference with an assumed underlying evolutionary need to see without being seen.

Prospect-refuge theory is not, and has not traditionally been presented as, an integrated theory of

environmental aesthetics. It has not attempted to integrate any other environmental assessment method, and performs poorly when included as a predictor or preference in empirical landscape research (see Kaplan & Kaplan, 1989).

The information processing theory of environmental aesthetics proposed by Kaplan and Kaplan (1989) is also fundamentally method-specific, although some attempts have been made to extend the range of the theory by associating it with human evolutionary theory (Kaplan, 1987). The cognitive theory of the Kaplans is based on elements of information processing. The common presentation of this theory is via a two by two design, crossing type of activity--exploration or understanding--with type of information--immediate or inferred. This conceptual design yields four factors: Mystery, complexity, coherence, and legibility.[3] These psychological factors of information processing are then used to explain aesthetic quality and resultant preferences.

Although at times the Kaplans have claimed theoretical incommensurability with other aesthetic assessment techniques (Kaplan, 1987), they recently attempted to integrate their cognitive theory with other methods of

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[3]Although currently presented as conceptual factors, these factors should be considered *a posteriori* as they are the result of an exploratory factor analysis (see Kaplan, Kaplan, & Wendt, 1972).

assessing aesthetic quality. The cognitive theory of aesthetic quality, however, continues to be fundamentally method specific, and adheres closely to its own prescribed methodology (Kaplan & Kaplan, 1989).

Finally, affective theories of landscape preference explain environmental preference in relation to immediate affective responses of like-dislike or pleasure (Ulrich, 1983). Both emotional and psychophysiological measures are related to aesthetic preferences for urban vs. natural environments, as well as to investigate environmental contributions to physiological recovery from stressors (Ulrich, 1986). Consequently, the focus of the affective theory is centered on describing human responses to general environmental features.

Affective theories are limited as the basis for any integrative theory of aesthetic quality because integration of different perspectives is not a priority (Ulrich, 1983). In addition, the affective theory must await continued progress in both psychological and physiological theory as well as in research regarding emotion and affect.

Each theory of environmental aesthetics is limited in the breadth of phenomena it attempts to explain, understand, or predict, and this constraint is fundamentally based on the methodology employed by each theory. In order to free environmental aesthetic theory from this constraint, one

must realize that human perceptions of aesthetic quality are the result of a variety of interrelated components including environmental attributes, sociocultural characteristics, and psychological factors (Zube et al., 1982). Therefore, an integrative theory must address these issues in a manner that is not specific to any one method of environmental assessment.

Theory Integration in Environmental Aesthetics

Although no theory of environmental aesthetics has been proposed that transcends--or can be generalized beyond--the original method of measurement, a number of scholars have addressed the issue. Appleton (1975) argues that the lack of an underlying theoretical structure throughout aesthetics limits the ability of landscape research to diagnose a situation, prescribe a change, and provide some prognosis about future conditions. In other words, the lack of fundamental aesthetic principles for landscapes inhibits the identification of an environmental condition, prescription of an intervention for improving the situation, or prediction of the consequences for visual quality. Hence, the lack of a unified aesthetic theory relegates researchers and designers to making numerous assumptions about the fundamental nature of the aesthetic experience.

Four suggestions have been offered by Zube (1984) regarding what some basic tenets of an integrative theory of

aesthetic preference would have to accomplish: (1) The theory must provide a framework bridging different methods of environmental assessment, (2) The theory must specify relationships between both qualitative and quantitative variables, (3) The theory must pertain to both natural and urban landscapes, and (4) The theory must encompass diverse geographic scales. Restated, a unified theory of aesthetic preference must integrate different environmental assessment methods, types of data, landscapes, and units of management. These four criteria seem to be reasonable standards for any theory seeking to explain fundamental principles of landscape aesthetics because they emphasize the fundamental importance of theoretical scope or breadth of phenomena entertained.

Methodological Requirements for the Test of a Theory

In order to avoid a theory of environmental aesthetics that is specific to a particular method of measurement, it may prove useful to examine one methodological tactic that is employed between different methods and is not limited to a single method. The fundamental consideration underlying all empirical methods is adequate measurement (Petrinovich, 1979; Meehl, 1990). Although criteria such as internal, external, and ecological validity are all necessary to ensure adequate measurement, these criteria are commonly

focused within a single method of assessment (Ribe, 1989; Meehl, 1990).

One criterion that was designed to intentionally cross barriers between different methods is construct validity (Cronbach & Meehl, 1955). Construct validity, whether or not a hypothetical entity exists as postulated, depends on two independent assessments: Convergent validity and discriminant validity (Campbell & Fiske, 1959). Convergent validity implies that different methods that proport to measure the same construct should be highly correlated with one another. Discriminant validity refers to the premise that tests measuring one construct should not be as highly correlated with tests proporting to measure other constructs as with tests measuring the same construct (Nunnally, 1978; Ferketich et al., 1991).

In order to develop theories that are not restricted by the method of measurement, one must establish the construct validity of some latent attribute assumed to be reflected by the measure but <u>not</u> operationally defined.[4] Thus, the focus of the investigation shifts from an examination of specific

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[4]This latent attribute or quality is postulated to exist, and therefore is often referred to as a "latent construct." Although traits are commonly used to refer to psychological features, the idea can easily be expanded to include concepts or theoretical statements (Bentler, 1989).

behaviors within a single method to an investigation of the underlying traits or processes between methods.

The original multi-trait multi-method analysis proposed by Campbell and Fiske (1959) was an attempt to investigate underlying traits by partialling out the effect of the method of measurement. Each observed score is considered to be a trait-method unit; or each score reflects the trait being measured (i.e., true variance), but also reflects in part the influence of the measure (i.e., systematic error variance). Therefore, if one uses a number of different methods to assess one or more traits, one should be able to estimate the effect of the method of measurement and obtain a better estimate (i.e., true score) of the underlying trait (Nunnally, 1978).

The implications this has for the assessment of aesthetic quality are thought provoking (Craik & Feimer, 1987). As previously discussed, each aesthetic theory specifically addresses only one method of measuring aesthetic quality. As will be shown, each method specifies aesthetic quality in operational terms unique to each assessment. Hence, the results of each are confounded by the method of measurement, and therefore are unable to obtain a better estimate of "aesthetic quality." Freed from these constraints, a factual investigation of the underlying principles of aesthetic quality could be pursued.

Methods of Environmental Assessment

A number of different methods for assessing the aesthetic quality of environments have been developed over the past 30 years. From those methods that rely upon "experts" to judge the scenic quality of a landscape to those methods that rely upon "naive" observers, all methods share the same basic interest: To explain or predict systematic aesthetic preferences between different environments[5] (Zube et al., 1982; Daniel & Vining, 1983). It is assumed by most of these methods that aesthetic preferences are direct reflections of the aesthetic quality of the environment.

These different methods have been conceptually organized into five general categories by Daniel and Vining (1983), based on what properties each model emphasizes in explaining landscape preferences. The ecological method characterizes visual quality in terms of "naturalness," which is commonly measured in biological terms (e.g., ecological diversity or uniqueness ratio). The formal aesthetic method focuses on expert assessment of aesthetic

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[5]Two rival assumptions underlie expert-based assessments: (1) that perception of professionals are valid predictors of public perception (Pitt & Zube, 1987) and (2) that perceptions of professionals are necessary because public preferences are either inadequate or inappropriate (Carlson, 1977). Although the former assumption would postulate a similar underlying construct, the latter assumption would postulate different constructs between expert and naive-observers.

quality by design professionals (e.g., architects and landscape architects) based on "universal" principles of aesthetics. The psychophysical method relates objective physical measurements of the landscape (e.g., volume of grass or number, species and size of trees) to judgments of preference. The psychological method investigates judgments of visual quality in relation to higher order cognitive processes (e.g., the legibility, complexity, or mystery of environmental information). The phenomenological method concentrates on subjective feelings, expectations, and interpretations at the individual level of analysis, and therefore the results do not usually provide any measure or even ranking of different environments. The methodological separation postulated by Daniel and Vining (1983) and Zube et al. (1982) has been widely accepted by environment preference researchers, with a few exceptions (Craik, 1981).

Three of the landscape assessment methods have enjoyed considerable pragmatic success in predicting aesthetic preferences. However, all of these methods have been criticized in the last decade because of their atheoretical dispositions, whether tacitly implied or explicitly expressed (Zube et al., 1982; Zube, 1984; Gobster & Chenoweth, 1989). This lack of theoretical development has severely hampered integration of the different methods, and therefore has postponed any fundamental understanding of

what combination of elements contribute to scenic quality or beauty.

Comparison of Three Contending Methods

Two reviews of environmental assessment methods offered by Zube et al. (1982) and Daniel and Vining (1983) have independently produced very similar organizational categories. Only three of these techniques--formal aesthetic, psychophysical, and psychological--have achieved a level of methodological sophistication necessary to allow a comparison across content domains. The ecological and phenomenological models have traditionally not been as methodologically rigorous as the others, and therefore do not allow for the determination of known levels of reliability, sensitivity and utility (Daniel & Vining, 1983).

As previously stated, differences between environmental assessment methods are based on the assumptions each makes about the salient environmental properties that contribute to aesthetic judgments. Each method will be assessed based on its own assumptions regarding aesthetic judgments, the procedures commonly used to assess scenic beauty or quality, and acknowledged methodological limitations.

The formal aesthetic model of environmental assessment relies upon observers formally trained in design-related fields. The fundamental assumption of the formal aesthetic

model is that the aesthetic value of an environment is determined by abstract features of the environment. First these formal artistic properties, such as basic forms, lines, and textures, are identified, and then interrelationships between these characteristics are examined (Daniel & Vining, 1983; Zube et al., 1982). Judgments of the "diversity," "harmony," "similarity" and "contrast" of these properties and relationships between them are subsequently made.

The formal aesthetic method of environmental assessment is an expert-based model (Zube et al., 1982). Rather than relying on naive observers to appraise scenic beauty, a formal aesthetic assessment relies on trained observers to determine the visual quality of an environment based on artistic and design-oriented elements. Unlike other methods, the formal aesthetic method begins with an implicit *a priori* theory as to what elements are salient in the assessment of landscape quality.

The formal aesthetic method is criticized in terms of low reliability among expert judgments, low sensitivity to environmental change, and uncertain construct validity of the artistic properties. The method is, however, widely used by resource management agencies such as the Bureau of Land Management and the United States Forest Service. Because it is used so abundantly and because it represents

the artistic component of aesthetic quality, the formal aesthetic model was selected to be included in the present study.

The psychophysical method seeks to establish relationships between quantifiable environmental stimuli and the perceptual responses of naive observers (Daniel & Vining, 1983; Zube et al., 1982). In other words, practitioners of the psychophysical method are interested in discovering the relationships between objective, physical or bio-physical attributes of an environment and their subsequent impact on psychological responses. The fundamental assumption of this model is that measured landscape elements relate in some systematic way to perceptions of environmental preference.

The psychophysical method seeks to establish a stimulus-response relationship between the physical properties of an environment and observer evaluations or behavior. Hence, physical features of landscapes are selected on the basis of pragmatic concerns or suspected importance, and empirically measured. The underlying goal of this method is to provide accurate and reliable predictions of observer's perceptions of landscape quality.[6]

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[6]This pragmatic aspect is not required. The main characteristic of this method is that physical features be measured objectively and independently of the psychological response.

The psychophysical model has been criticized for being too narrow in scope and fundamentally atheoretical in practice. However, researchers have reported high reliability between observers and sensitivity of observer preferences to environmental changes. The validity in the psychophysical method is based on the assumption that large numbers of naive observers provide an appropriate indication of visual quality. The psychophysical model offers management and planning services the ability to examine public perception of scenic beauty with objective and quantifiable data. Because it emphasizes the importance of the physical features of an environment and because of the consistency (i.e., reliability and validity) of the measure, the psychophysical model was selected to be included in this study.

The psychological method seeks to explain preference for natural environments in relation to cognitive and/or affective reactions to the landscape (Daniel & Vining, 1983; Zube et al., 1982). The fundamental purpose of this method is to describe and explain the psychological basis for landscape preferences. A number of psychological predictors of aesthetic preference have been postulated throughout the history of this method, beginning with Berlyne (1960), but none more consistently or forcefully than those advocated by Steve and Rachel Kaplan.

In the Kaplans' psychological model of environmental preference, four predictors are proposed based on an individual's ability to process information: legibility, coherence, complexity, and mystery. The underlying assumption of this particular assessment technique is that both quality and ease of information processing are consistently related to environmental preferences.

The Kaplans' psychological model has been criticized because of the exploratory process initially used to develop their psychological dimensions. However, reliability has been found to be relatively high, and these psychological factors have been reported to be sensitive to differences between environments. The validity of psychological predictors is difficult to determine because there is no objective standard by which to determine whether any deviation exists. The utility of the psychological method is also limited in the sense that psychological factors are not directly associated with identifiable, independently measurable and manipulatable features of the environment. Because it addresses elements of human processes, the psychological method was selected to be included in this study.

The formal aesthetic, psychophysical and psychological methods of landscape assessment each address unique aspects of aesthetic quality. Individually, however, each is

limited to its own domain of content, even though the formal aesthetic and psychological methods claim to be universally applicable. If employed collectively, each method could lend its predictive strength, and the accompanying limitations in estimating aesthetic quality could be significantly reduced (Nunnally, 1978; Ferketich et al., 1991). Some form of integration, therefore, is apparently desirable. However, the ensuing inquiry must proceed such that the advantages of this integration are reaped without the introduction of additional confounds or unanticipated methodological problems.

Previous Attempts at Integration

In response to criticisms regarding the insufficiency of exclusively using single methods for environmental assessment, a number of attempts at integrating different methodologies have been recently reported (Kaplan et al., 1989; Gobster & Chenoweth, 1989; Ruddell et al., 1990). Although each begins with good intentions regarding the integration of the aesthetic preference models, the experimental design and lack of theoretical purpose inherently limit the results of each study. A review of two examples follows.

Kaplan et al. (1989) compare the relative contribution of variables from a number of different assessment methods. The four domains of variables included in the experimental

design--physical attributes, landcover types, information, and perception based--supposedly represent the formal aesthetic, psychophysical, and psychological assessment methods. After preference data were collected, independent multiple regression analyses were conducted separately for each variable domain. Then all twenty variables across the four domains were entered into a single multiple regression equation. Conclusions about the utility and relative predictive ability of each assessment method represented by the variable domains were based on these analyses.

The Kaplan et al. (1989) experiment suffers from a number of design flaws and theoretical problems. First, the physical attribute variable domain included only a limited number of physical measures that have historically been viewed as "physical" (cf., Daniel & Boster, 1976; Ribe, 1989). As the four variables in the Kaplan model of environmental preference do not exhaust all of the psychological predictors used to explain aesthetic preferences, so too the seven landcover/landform variables used to represent the psychophysical method depict a paltry sampling of the possible physical attributes of an environment. In addition, some psychophysical researchers might argue that since these variables are computed using subjective judgments, landform and landcover (the only

variables rated on a binary scale) should not even be considered physical in nature.

Second, the statistical technique of multiple regression is limited when the ratio between the degrees of freedom in the sample to the number of predictive variables is small (Pedhazur, 1978). The final multiple regression equation in Kaplan et al. (1989) was based on the ratings of only 59 scenes with 20 predictive variables. The instability of the regression weights would be great, and should have precluded any strong conclusions based on the individual partial correlations. Nonetheless, the authors took the results to prove a "lack of effectiveness" in regard to the physical attribute variables.

Third, the selection of environmental stimuli was too narrow for the universal conclusions offered (Zube, 1984). The 59 scenes were collected from the same general area (6 x 6 mile) in Michigan, and offered "very little variation in landform" (Kaplan et al., 1989, p. 520) and apparently other dimensions as well. To assess the relative contribution of predictors from different methods, variety within each of the domains is necessary for accurate estimates of relative explanatory power (Campbell & Fiske, 1969; Widaman, 1985). Consequently, more divergent types of environments would provide a better set of stimuli for this type of design.

Finally, conclusions based on an exploratory regression analysis without the benefit of any confirmatory analysis are tenuous (Kim & Mueller, 1978; Petrinovich, 1979; Ferketich et al., 1991). Considering the problems in identification and estimation of effect size, the results of the final regression reported by the Kaplans are questionable. In order to draw inferences back to theory, exploratory procedures must be followed by confirmatory analyses to ensure the reliability and validity of the results.

A related example of attempted method integration can be found in Gobster and Chenoweth (1989). The authors employed a multidimensional analysis to identify predictive dimensions of environmental preference. Experiment 1 had subjects select between two scenes of a similar landscape type--forest, river and agriculture--in a paired comparison design. A multidimensional analysis was conducted on these ordinal data, resulting in a number of separate aesthetic dimensions. In Experiment 2, subjects rated all of the same scenes along thirteen physical descriptors, eleven artistic descriptors, and ten psychological descriptors. These were then correlated to the resulting dimensions of experiment 1, and canonical analyses were run in an attempt to associate the descriptors along the preference dimensions.

Although this experiment also attempted to integrate the formal aesthetic, psychophysical and psychological methods, there were certain problems in the experimental design and theoretical implications. First, the specification of physical descriptors does not include any objective measures common to the psychophysical approach (Daniel & Boster, 1976; Ribe, 1989). Estimates of naive observers regarding tree density and tree age are not considered indicative of the psychophysical approach.

Second, the canonical analysis conducted to associate the dimensions of preference to the descriptor variables requires a number of assumptions regarding the nature of aesthetic experience. To list these assumptions (Thompson, 1984) is beyond the scope of this paper, but suffice to say that these assumptions were not explicitly articulated in the context of the article. For instance, *a priori* hierarchical specification in the selection of variables is necessary to ensure that the combination of variables is not merely the best predicted by the test data. Theoretical guidance is legitimate throughout the empirical process, but it is not legitimate when the theory which guides the inquiry is left unstated (Ferketich et al., 1991).

Third, no confirmatory analysis was conducted to ensure the reliability or validity of the original results (Kim & Mueller, 1978; Muliak, 1988). This procedure is especially

necessary when canonical and principal components factor analyses are conducted. The conclusions of Gobster and Chenoweth (1989), therefore, can only be considered as exploratory in nature.

In sum, the integration of different methods has been broached by some authors, yet each has proven to be untenable. An empirical integration of different methods must accomplish at least three tasks. One, the manner in which each variable is measured must meet accepted standards for each assessment method. Two, the evaluation of different environmental assessment methods must extend across a number of different types of landscapes. Three, any empirically derived associations among variables or methods must be subjected to confirmatory analysis.

Purpose

The purpose of the present research is to empirically derive fundamental aesthetic principles for landscapes through the integration of conventional methods of environmental assessment. In sum, this study addresses three basic questions: (1) What traits or constructs are being measured by the environmental assessment methods currently used?, (2) Are these constructs independent of the methods used to assess them?, and (3) Can an integrative theory of environmental aesthetics be empirically developed? However, to answer these questions without falling into the

pitfalls that befell previous attempts at integration, a number of methodological tenets need to be established *a priori*.

In order to answer the first two questions, a conscious effort must be made to avoid method-specific results and address the construct validity of each measure. By employing a number of different environmental assessment methods in the design, one can detect, assess, and control for variation due to the method of measurement, thereby obtaining a better estimate of the variation due to the underlying variable of interest: aesthetic quality. Since the formal aesthetic, psychological, and psychophysical methods are the most commonly used and most methodologically sophisticated, they were selected for integration. In addition, these methods also encompass an interesting distinction between observer-based and expert-based methods of measurement. In order to provide a framework by which to bridge different methods of measurement, the questions of what is being measured by each method and whether it is distinguishable from the method is of paramount importance.

Second, the environmental stimuli should not be limited to one landscape type. In order to develop universal principles of environmental aesthetics, one must select from environments that are diverse in landscape type and form. Hence, a variety of environments ranging from forested to

sub-urban landscapes need to be sampled. But, these different environments need to be represented using the same medium (e.g., color slide or photographs) to rule out any possible influence of the representation itself. Multiple stimulus situations, just as in multiple response measures, provide a useful basis upon which to generate universal principles of environmental aesthetics.

Not only should landscape assessments afford the ability to diagnose or describe a current situation, but they should also effect the prescription of change. This goal, as Zube (1984) argued, centers around the identification and specification of relationships between quantitative and qualitative data. One established procedure capable of accomplishing this task--determining predictive or criterion validity--involves connecting the hypothesized attribute or construct to something external to the measuring instrument itself (Nunnally, 1978). Since landscape assessments necessarily involve the measurement of human values, any universal principles of environmental aesthetics should be related--in an identifiable fashion--to the physical properties of the landscape.

Method

Overview

The experimental method can be divided into three progressive stages: (1) data collection, (2) data reduction, and (3) factor association. The data collection stage involved gathering data for all three methods of environmental assessment for each of the four selected landscape types. Psychophysical methodology addresses the association between the physical features of a landscape and human perceptual response, while psychological methodology focuses upon the association between psychological factors and human perceptual response. Consequently, preference judgments and informational judgments for the psychophysical and psychological methods[7] were collected from naive observers, with no one observer using more than one method or rating more than one landscape type. The formal aesthetic judgments were collected using trained observers (landscape architecture students), with each observer rating all of the dimensions within the formal aesthetic method. In addition, each expert observer provided a general

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[7]To avoid confusion with the prescribed methodologies, the response measures for both the psychophysical and the psychological methods will be referred to as preference and informational judgments respectively. Common to all of the ratings collected for each category of judgments, however, is the assumption that each is an indicator of some underlying "aesthetic" construct.

preference judgment for each of the scenes in each of the four landscape types. Each method used in this study followed published procedures of the respective methods.

In the second stage, factor analyses were conducted within each judgment type across the four landscapes to determine what general environmental characteristics were measured by each method. A second-order factor analysis was then run across assessment methods to separate trait and method factors, in order to derive basic aesthetic characteristics which transcend both method of measurement and landscape type.

In the final stage, multiple regression analyses were used to predict the common aesthetic characteristics from the physical data for each of the landscapes. Using the obtained factors from stage two as the dependent variables and the physical data from each landscape as the independent variables, a series of regression equations were conducted to provide the best predictive solution for the universal factors.

This study was designed to provide a new understanding of (1) whether universal principles of aesthetic quality for landscapes exist across different environments and methods of assessment and (2) how well physical measures of the environment predict those universal characteristics.

Design

Unlike most psychological experiments, the unit of analysis in this study was the individual landscape scene, rather than an observer or respondent. Scenes were nested within four different types of landscape (Environment): Alaska, Eastern Valley, Nearview Forest, and Southwest. Each individual rating scale (Rating) was nested within the appropriate method of measurement (Judgment)--see Table 1. The Judgment variable was fully crossed with Environment, such that every scene within each Environment was assessed using every Rating and Judgment.

The preference judgments included three different rating scales: Aesthetic Quality, Personal Preference, and Scenic Beauty. The informational judgments included four different rating scales: Coherence, Complexity, Legibility, and Mystery. The formal aesthetic judgments included six different rating scales: Landscape, Vegetation, Water, Color, Scarcity, and Cultural Modification. In addition, a summation scale--Scenery--was included in the formal aesthetic judgments (USDI-BLM, 1980).

Subjects

A total of one thousand and fifty-one subjects was used in this study. Subjects were recruited in two ways. Subjects for the naive observer ratings (viz., the

Table 1. Nesting of Ratings Within Judgment

	AK*	EV	NV	SW
Preference				
Aesthetic Quality	x	x	x	x
Personal Preference	x	x	x	x
Scenic Beauty	x	x	x	x
Informational				
Coherence	x	x	x	x
Complexity	x	x	x	x
Legibility	x	x	x	x
Mystery	x	x	x	x
Formal Aesthetic				
Landform	x	x	x	x
Vegetation	x	x	x	x
Water	x	x	x	x
Color	x	x	x	x
Scarcity	x	x	x	x
Cultural Modifications	x	x	x	x

* **AK**=Alaska, **EV**=Eastern Valley, **NV**=Nearview Forest, and **SW**=Southwest.

preference and informational judgments) were enrolled in introductory psychology classes at the University of Arizona in the fall semester of 1991 and the spring semester of 1992. One thousand and forty-three subjects were used throughout the naive rating conditions, and each student received credit toward a research requirement for participation in this study. A summary of the number of subjects within each environment by rating condition cell is presented in Table 2.

Subjects for the expert observer ratings (viz., the formal aesthetic judgments) were recruited from an upper division landscape architecture design class. Eight subjects completed both sessions, and each received five dollars for her or his participation in this study.

Stimuli

In compliance with the established methodological tenets discussed previously, the representations of different landscapes for this study satisfied a number of criteria. First, the environments were diverse in landscape type and form, covering a wide range of environments from mountains to canyons and from rivers to forests to sub-urban areas. Second, physical data were available for every landscape which were representative of the usual measures of the psychophysical method. Third, the stimuli were all presented in the same representational medium, such

Table 2. Number of Naive Subjects and Reliabilities Per Condition

	AK *	EV	NV	SW
AQ				
n	41	30	37	42
r_1	.93	.95	.96	.97
r_2	.24	.41	.38	.42
r_3	.47	.62	.60	.63
PP				
n	45	42	34	35
r_1	.95	.96	.96	.96
r_2	.29	.37	.40	.38
r_3	.53	.60	.62	.60
SB				
n	46 (8)	38 (8)	33 (8)	39 (8)
r_1	.96 (.91)	.96 (.92)	.96 (.82)	.96 (.82)
r_2	.33 (.52)	.42 (.60)	.45 (.36)	.37 (.37)
r_3	.56 (.70)	.63 (.74)	.66 (.54)	.60 (.55)
CH				
n	30	41	35	41
r_1	.74	.85	.84	.96
r_2	.09	.12	.13	.40
r_3	.26	.33	.33	.63
CM				
n	43	42	33	39
r_1	.95	.92	.84	.92
r_2	.33	.22	.14	.24
r_3	.56	.46	.34	.48
LG				
n	35	30	35	32
r_1	.88	.98	.94	.96
r_2	.17	.58	.32	.42
r_3	.39	.70	.55	.64
MY				
n	41	40	30	34
r_1	.88	.95	.88	.86
r_2	.15	.30	.19	.15
r_3	.36	.54	.41	.36

* **AK**=Alaska, **EV**=Eastern Valley, **NV**=Nearview Forest, **SW**=Southwest, **AQ**=Aesthetic Quality, **PP**=Personal Preference, **SB**=Scenic Beauty, **CH**=Coherence, **CM**=Complexity, **LG**=Legibility, **MY**=Mystery, r_1=group-to-group correlation, r_2=observer-to-observer correlation, and r_3=observer-to-group. ( )=Landscape Architecture Students.

that no uncontrolled effect of the representational media on judgments of visual quality was introduced. Finally, the scenes for each landscape type were presented to separate groups of observers, mutually exclusive of the other landscapes, to ensure that subjects' ratings within each landscape type were based on consistent criteria.[8]

To meet these tenets, four different landscape types were selected. These landscape types ranged from southwestern national parks and monuments to ponderosa pine forests to Alaska vistas to an eastern river valley. In addition to diverse natural features, the eastern river valley landscape included some sub-urban scenes. Exclusively urban environments were not included in this proposal because consensus has not been reached regarding what physical measures one uses to represent these environments (Daniel & Vining, 1983). Hence, a wide but not exhaustive range of different environments is represented by this stimulus selection.

Alaska Stimuli. A total of sixty scenes was selected for this environmental condition from an on-going USFS-sponsored study of the effects of a spruce-bark beetle outbreak on public perception and attitudes (Daniel &

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[8]Brown and Daniel (1987) demonstrated that ratings of forest scenes were influenced by the content of previously viewed scenes, thereby shifting the criteria used by the subject to assign ratings.

Orland, in progress). The study landscape in this environmental condition consisted of forest vistas sampled from the Kenai Peninsula southeast of Anchorage, Alaska. Beetle damage to spruce trees in the scenes ranged from nonexistent to approximately 90% tree mortality, with both old and newly killed trees represented.[9] Approximately half of the scenes contained either still or moving water. The color slides were captured with a 35mm camera equipped with a 50mm lens using Ektachrome Plus (ASA 100) film.

Forty-eight of the sixty scenes were selected from those used in the Daniel and Orland study. An additional twenty-two scenes were randomly selected from the other scenes collected over the course of the three-year study (1989-1991). Twelve scenes were randomly assigned to the experimental group, while the remaining ten were used as preview scenes for the rest of the Alaska stimuli.

Eastern Valley Stimuli. A total of fifty-six scenes were selected for this environmental condition from the entire sample used in Zube et al. (1975). The study landscape in this environmental condition consisted of a

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[9]The spruce-bark beetle, *Dendroctonus rufipennis*, attacks white and Sitka spruce by boring galleries in the soft inner bark to lay clutches of eggs. When the continuous feeding of the beetle larvae and the damage due to a pathogenic fungus carried by the adult beetle overcome the natural resistance of the host, the tree dies. Newly beetle-killed trees are bright to dull red because they retain their needles, while older beetle-killed trees, after losing their needles, are grey.

variety of scenes along the southern half of the Connecticut River Valley, which runs through the states of Connecticut and Massachusetts. Approximately one-third of the scenes contained either still or moving water. The color slides were duplicates of the original Kodacolor slides used in Zube et al. (1975).

Since no additional scenes were available from the original study, ten preview scenes were selected from the experimental scenes. These ten scenes were randomly selected from the fifty-six experimental scenes and duplicated to also serve as preview scenes for the Eastern Valley stimuli.

Nearview Forest Stimuli. A total of one-hundred and twenty scenes, representing thirty different homogenous forest stands, were selected for this environmental condition from Brown and Daniel (1984). The study landscape in this environmental condition consisted of a variety of scenes from ponderosa pine forests in northern Arizona. All of the scenes were taken within the forest canopy (i.e., they were not "vistas"). None of the forest scenes sampled contained water. The color slides were captured with a 35mm camera equipped with a 55mm lens on Kodachrome (ASA 64) film.

Selection of forest stand points was based on the mean SBE value over the four scenes that represented each point.

A stratified sampling technique was used in order to ensure a range of SBE values similar to the original study. Three strata were identified: High, Medium, and Low. The High category required a mean of at least a 75 SBE, the Low category required a mean of at most -50 SBE, and the Medium category required a mean between 12 to 20 SBE.

From the remaining scenes used in Brown and Daniel (1984), a random sample of ten scenes (representing 10 different forest stand points) was selected to serve as preview scenes for the Nearview Forest stimuli. Unlike the experimental scenes, no effort was made to ensure the selected scenes were from the same forest stand.

Southwest Stimuli. A total of sixty scenes were provided for this environmental condition by Air Resource Specialists, Inc. and the National Park Service (NPS). The study landscape in this environmental condition consisted of six different National Park or Monument landscapes,[10] each represented by a constant scene varying across ten levels of visibility ranging from very clear (Visual Range=380km) to very poor (Visual Range=20km). One

[10]The monitoring locations represented by this sample were Big Bend National Park, TX; Capital Reef National Park, UT; Chiricahua National Monument, AZ; Guadalupe Mountains National Park, TX; Lake Mead National Recreation Area, AZ/NV; and Navajo National Monument, AZ.

of the six landscapes contained water. The color slides were captured using a 35mm camera on Kodachrome film.

The scenes were sampled from NPS air quality/visibility monitoring sites throughout the southwest. No additional preview scenes were used because the stimuli were presented in a blocked format (Parsons & Daniel, 1988). In a blocked format, subjects preview all of the different versions (visibility levels) for a given landscape scene before rating each version within that landscape.

Procedure

Naive Participants. Naive subjects were nested within the crossed conditions of Environment and Rating such that no one subject used more than one rating scale (Rating) or viewed more than one landscape type (Environment). In addition, subjects were also nested within one of three random presentation orders (Order), such that no one subject viewed more than one presentation order.

The order of conducting experimental sessions was randomly assigned across Environment and Rating, but within Order. In other words, each Environment X Rating condition of the first Order was randomly assigned into an order by which to conduct experimental sessions, and then similarly for each of the following two random orders. For each random order, each Environment X Rating condition was required to obtain a sample size of at least ten subjects

before the next condition was run. Naive subjects were tested across both the Fall 1991 and Spring 1992 semesters.

At the beginning of each session, subjects were read standardized instructions for the particular Environment X Rating condition (see Appendix A for a complete transcript of the instructions). Subjects were instructed to rate the scene for the construct appropriate to the Environment X Rating condition to which they were assigned.[11] In every condition a rating of 1 indicated the low end of the scale. Subjects were also asked to use the full range of each scale in order to compare the rated quality of one area to another within the set being judged.

For the Alaska, Eastern Valley, and Nearview stimuli, subjects viewed the appropriate preview scenes for the landscape type they were rating. Preview scenes were shown for 5 seconds each. Subjects were then instructed by the experimenter to rate the subsequent experimental scenes using the appropriate construct and scale. The scenes to be rated by the subjects were shown for 8 seconds each.

For the Southwest stimuli, a blocked procedure was adopted for presentation (Parsons & Daniel, 1988). Subjects were instructed that they would see several different

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[11]The informational judgments usually employ a 5-point scale, while the preference judgments use either a 5 or 10-point scale. In each case, the most frequently published definition was used to describe each construct.

versions of the same landscape scene. Differences between versions were attributed to lighting, visibility, weather, and other conditions. The set of 10 scenes (visibility levels) for a particular landscape was first shown for 3 seconds per scene in a random order. Immediately following this preview, the subjects were instructed to rate the same set of scenes using the appropriate construct and scale. The scenes to be rated by the subjects were shown for 8 seconds each. The next set of 10 scenes for the next landscape was then previewed and subsequently rated, and so on for all six different landscapes.

For all Environment X Rating conditions, subjects' ratings for each of the three randomized orders were adjusted for presentation order, and then scaled using the program RMRATE (Brown et al., 1990) to produce comparable standardized values across the different scales. This scaling procedure translates raw ratings into a standardized interval scale index, controlling for variations in an individual's use of the arbitrary 5 or 10-point scales.[12]

Expert Participants. Unlike the naive observers, the landscape architecture students viewed all four Environment conditions over the course of two separate two and one-half

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[12]Although these values are usually referred to as Scenic Beauty Estimates (SBE), the scaling procedure can be used for any measure using a numerical scale between 5 and 10 points.

hour sessions in the spring semester of 1992. Because of the small sample size (n=8), only one random order of presentation for each Environment was used.

In order not to fatigue the subjects, only two Environment conditions were viewed and rated per session. The Alaska and Eastern Valley stimuli were paired for the first session, and the Nearview and Southwest stimuli were paired for the second session. In addition, ten to fifteen minute breaks were given between each Environment condition, and between the formal aesthetic judgments and the one preference judgment (Scenic Beauty) situations.

The Visual Resource Management (VRM) system of the Bureau of Land Management (USDI-BLM, 1980) was selected as a representative example of the formal aesthetic method. This VRM system contains six relevant[13] factors that are initially rated on a 3-point categorical scale (see Table 3). At the beginning of each session, a description of each factor and category was provided by the experimenter. No landscape architecture student claimed to have formal training in the Visual Resource Management technique, but their course of study had included related design-based landscape assessment procedures. The summation procedure

[13]The seventh factor, "adjacent scenery," was not appropriate for inclusion in this study because slides of the adjacent scenery for each scene were not available.

Table 3. Description of Formal Aesthetic Categories

	Landform	Vegetation	Water	Color	Scarcity	Cultural Modifications
1	High vertical relief such as prominent cliffs, spires or massive rock outcrops; or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers.	A variety of vegetative types in interesting forms, textures, and patterns	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape.	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields.	One of a kind; or unusually memorable; or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing.	Free from esthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety.
2	Steep canyons, mesas, buttes, cinder cones and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features present and interesting though not dominant or exceptional.	Some variety of vegetation, but only one or two types.	Flowing or still, but not dominant in the landscape.	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element.	Distinctive, though somewhat similar to others within the region.	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensively that they are entirely negated; or modifications add little or no visual variety to the area.
3	Low, rolling hills, foothills or flat valley bottoms. Interesting, detailed landscape features few or lacking.	Little or no variety or contrast in vegetation.	Absent, or not noticeable.	Subtle color variations, contrast or interest; generally muted tones.	Interesting within its setting, but fairly common within the region.	Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced.

used to calculate the overall rating category, however, was not provided in order to ensure that the subjects only attended to the individual descriptor categories without anticipating the procedure's contribution to the final classification.

Subjects were instructed to review the criteria for each factor and category. For the Alaska, Eastern Valley, and Nearview stimuli, subjects viewed the appropriate preview scenes for the landscape type they were rating. Preview scenes were shown for 10 seconds each. Subjects were then instructed by the experimenter to rate the subsequent scenes on all six factors (See Appendix B for example of rating sheet). The scenes to be rated by the subjects were shown for 15 seconds each, but a subject could request additional time by raising her or his hand at the announcement that the 15 seconds had expired. If a subject requested more time, an additional 5 second period was provided.

For the Southwest stimuli, a blocked procedure was adopted for presentation (Parsons & Daniel, 1988). Subjects were instructed that they would see several different versions of the same landscape. The set of 10 scenes for a particular landscape was first shown for 3 seconds per scene. Immediately following this preview, subjects were instructed to rate the same scenes on all six factors. The

scenes to be rated by the subjects were shown for 15 seconds each. The next set of 10 scenes for the following landscape were then previewed and subsequently rated, and so on for all six different landscapes.

After the subjects had rated both of the Environment conditions for that session, they were instructed to rate the same scenes using the Scenic Beauty (preference) rating. For this condition, subjects were provided with the same instructions used for the naive participants, but scenes were shown for 5 seconds each. Subjects were provided with a 10-15 minute break between presentation of the different Environment conditions and the different Rating conditions.

For the formal aesthetic ratings, subjects' ratings were compiled using the published Visual Resource Management procedures (USDI-BLM, 1980). Because the formal aesthetic method is intended to be conducted by a single rater, the mode of the category ratings by the eight subjects for each factor was used as the indicator of central tendency. The Scenic Beauty ratings were scaled using RMRATE (Brown et al., 1990).

Results

Data Collection

The data collection stage involved gathering data for all three methods of environmental assessment for each Environment. The goal of this stage was to determine the quality and integrity of ratings gathered using the two observer-based methods, preference and informational judgments, and the expert-based formal aesthetic judgments. Issues of interest for the observer-based methods were the effects of random order of presentation, assessment of reliability coefficients, and an examination of the intercorrelation matrix within each method. Issues of interest for the expert-based method were the level of agreement between individual landscape architects, scaling procedures, and the relationship of the one preference judgment to those collected from the naive observers.

Observer-based Methods

Random Order. For the naive-observer rating sessions, three random orders were generated within each Environment to investigate any order-of-presentation effects. Mean ratings were averaged across subjects within each random order of each Environment. A Pearson correlation coefficient was then computed between the three random orders of each Environment X Rating conditions using the SAS

Table 4. Correlations Between Random Orders Across Environment

	AK*	EV	NV	SW
AQ				
R1-R2	.77	.81	.85	.81
R1-R3	.78	.78	.87	.88
R2-R3	.73	.86	.84	.84
PP				
R1-R2	.77	.91	.78	.78
R1-R3	.82	.80	.80	.86
R2-R3	.85	.83	.87	.87
SB				
R1-R2	.84	.85	.85	.86
R1-R3	.81	.84	.86	.81
R2-R3	.76	.87	.91	.82
CH				
R1-R2	.58	.59	.77	.77
R1-R3	.60	.68	.70	.88
R2-R3	.63	.61	.58	.83
CM				
R1-R2	.74	.61	.49	.85
R1-R3	.85	.47	.65	.74
R2-R3	.82	.77	.41	.69
LG				
R1-R2	.70	.92	.77	.84
R1-R3	.81	.91	.81	.82
R2-R3	.66	.92	.83	.81
MY				
R1-R2	.68	.80	.75	.53
R1-R3	.62	.84	.69	.64
R2-R3	.75	.80	.64	.63

* **AK**=Alaska, **EV**=Eastern Valley, **NV**=Nearview Forest, **SW**=Southwest, **AQ**=Aesthetic Quality, **PP**=Personal Preference, **SB**=Scenic Beauty, **CH**=Coherence, **CM**=Complexity, **LG**=Legibility, and **MY**=Mystery.

CORR procedure (SAS Institute, 1985). A summary of these computations is provided in Table 4.

The preference judgment condition included three different ratings: Aesthetic Quality, Personal Preference, and Scenic Beauty. The median correlation coefficient for the three random orders of ratings across all four Environments were .84, .83, and .84, respectively. The informational judgment condition included four different ratings: Coherence, Complexity, Legibility, and Mystery. For these ratings, the median correlation coefficient for the three random orders across all four Environments were .66, .72, .82, and .68, respectively.

Although the correlations between the three random orders for the informational judgment condition were consistently lower than the preference judgment condition, the correlations do not indicate any prevalent influence of the presentation order for either. As a result, the data from the three random orders for each Environment X Rating condition were combined into one data set for the rest of the analysis.

Intra-Class Correlation Coefficient. The group-to-group correlation, an indicator of the mean correlation between the experimental sample and any other hypothetical sample of the same size drawn from the same population, was used as a measure of the reliability of the

ratings within each Environment X Rating condition (Ebel, 1951). See Table 2 for an entire listing.

For the preference judgment condition, the median group-to-group reliability coefficients across all four Environments for Aesthetic Quality, Personal Preference, and Scenic Beauty ratings were .96, .96, and .96, respectively. In the informational judgment condition, the median group-to-group reliability coefficients across all four Environments for Coherence, Complexity, Legibility, and Mystery were .84, .92, .95, and .88, respectively.

The group-to-group correlations for both the preference and informational judgment conditions were consistent across Environment, indicating very high reliability (i.e., substantial consistency with any other group drawn from the same population). Again, the informational coefficients were slightly lower than the preference coefficients, but the difference between the medians was not large. The group-to-group correlations for the preference judgments reported in this study were very similar to those reported in previous experiments (viz., Brown & Daniel, 1984; Daniel & Orland, in progress). Since group-to-group correlations are not commonly calculated on ratings for informational judgments, no comparable references were available.

Other Indicators of Reliability. In addition to Ebel's (1951) group-to-group correlations, two other correlation

coefficients commonly used to assess the stability and reliability of ratings are observer-to-observer and observer-to-group (Daniel & Boster, 1976; Brown & Daniel, 1984). The observer-to-observer correlation is an indicator of the expected mean correlation among a group of individual observers. The observer-to-group correlation is an indicator of the extent to which an individual's ratings agree with the mean ratings of the other observers within that group. See Table 2 for a complete listing.

For the preference judgment condition, the median observer-to-observer reliability coefficients across all four Environments for Aesthetic Quality, Personal Preference, Scenic Beauty, and Scenic Beauty (Landscape Architecture Students) were .40, .34, .40, and .44, respectively. The median observer-to-group coefficients for the same ratings were .61, .60, .62, and .62, respectively. For the informational judgment condition, the median observer-to-observer reliability coefficients across all four Environments for Coherence, Complexity, Legibility, and Mystery were .12, .23, .37, and .17, respectively. The median observer-to-group coefficients for the same ratings were .33, .47, .60, and .39, respectively.

The median observer-to-observer and observer-to-group correlations for the preference judgment condition were again remarkably consistent across Environment, including

the Landscape Architecture students who were selected to be representative of "experts" in the field of aesthetics. Although considerably lower than the group-to-group correlations, as expected, the reported coefficient values for ratings of Aesthetic Quality, Personal Preference, and Scenic Beauty (naive and expert subjects) were similar to those reported in previous experiments employing preference judgments (viz., Brown & Daniel, 1984; Daniel & Orland, in progress).

The median observer-to-observer and observer-to-group correlations for the informational judgment condition were considerably more variable than those of the preference condition. Median observer-to-observer correlations ranged from .12 to .37, and median observer-to-group correlations ranged from .33 to .60. However, observer-to-observer and observer-to-group correlations are not reported for ratings within the psychological method, so no comparisons could be made with previous research to determine if this pattern is common.

Intercorrelations Within Judgment. Another means used to assess the stability of each rating scale was to compute correlation coefficients between ratings nested within the preference and informational conditions. The resulting matrices would provide simple bivariate measures of association for Rating within Judgment. For all

calculations, standardized scores were first computed for each scene using RMRATE (Brown et al., 1990). This scaling procedure translates raw ratings into a standardized interval scale index. Correlations were then calculated using the SAS CORR procedure (SAS Institute, 1985).

For the ratings within the preference judgment condition, the three resulting intercorrelations were AQ-PP r=.94, AQ-SB r=.94, and PP-SB r=.95 (See Table 5). In addition, the Scenic Beauty ratings completed by the landscape architecture students were also computed, and the three resulting correlations were AQ-LASB r=.82, PP-LASB r=.82, and SB-LASB r=.89. These correlation coefficients were lower due to the reduced sample size, but indicated a substantial positive relationship between Aesthetic Quality, Personal Preference, and Scenic Beauty for both naive and expert observers.

Some researchers have conceptually distinguished between Aesthetic Quality--the observer acting as a social judge comparing each scene to other areas--and Personal Preference--the observer merely indicating his/her own like or dislike for each scene (e.g., Craik & Zube, 1976). These results evidenced that subjects respond very similarly

Table 5. Correlations Between Ratings Within Preference Judgment Condition

	AQ*	PP	SB	LASB
AQ	1.00			
PP	.94	1.00		
SB	.94	.95	1.00	
LASB	.82	.82	.89	1.00

* **AQ**=Aesthetic Quality, **PP**=Personal Preference, **SB**=Scenic Beauty, and **LASB**=Landscape Architects' Scenic Beauty.

Table 6. Correlations Between Ratings Within Informational Judgment Condition

	CH*	CM	LG	MY
CH	1.00			
CM	.36	1.00		
LG	.33	.50	1.00	
MY	-.05	.09	-.59	1.00

* **CH**=Coherence, **CM**=Complexity, **LG**=Legibility, and **MY**=Mystery.

across a broad range of environmental stimuli regardless of instructions requesting that the observer make comparative appraisals to some standard, indicate her or his own personal taste, or rate it for scenic beauty.

In addition, the landscape architecture students--selected to be representative of expert-observers--correlated highly with the naive observers across all three preference judgments. Group-to-group, observer-to-observer, and observer-to-group correlations were very similar to those of the naive observer conditions, taking into account the difference in sample size. These results indicated that for preference judgments, naive and expert observers responded in an indistinguishable manner across landscape types.

For the ratings within the informational judgment condition, the six resulting intercorrelations were CH-CM r=.36, CH-LG r=.33, CH-MY r=-.05, CM-LG r=.50, CM-MY r=.09, and LG-MY r=-.59 (See Table 6). These correlations indicated an expected, substantial diversity among the four different ratings of Coherence, Complexity, Legibility, and Mystery in this condition.

In the process of determining if these inter-rating correlations were common, two problems were encountered: (1) previous research using these ratings rarely report

inter-rating correlation coefficients, and (2) when reported, only significant coefficients are cited. Of those coefficients reported, CH-CM varied from r=-.30 to r=-.51, CH-MY varied from r=-.28 to r=-.40, CM-LG was reported as r=-.27, and CM-MY varied from r=.20 to r=.52 (Kaplan & Kaplan, 1989). No coefficient in this study fell within the range of these previously reported parameters.

However, the ratings within the informational judgment condition were considered valid in relation to the psychological method for three distinct reasons. First, ratings were collected using published methodological guidelines and definitions. Although ratings within this condition are sometimes collected using small samples of landscape architecture students, about half of the published studies use groups of naive subjects to obtain ratings of Coherence, Complexity, Legibility, and Mystery. Second, the median intra-class correlation coefficients (group-to-group) were high across all four ratings, indicating stability. Finally, the previously reported intercorrelations were compiled within a single landscape type, and not calculated across four distinct landscape types as in the present study.

Expert-Based Methods

Since the Visual Resource Management process of the BLM is based on a categorical level of measurement, the mode for

the six ratings in the formal aesthetic method was used as the best measure of central tendency across the eight landscape architecture observers. The result was a single categorical score for each of the six ratings across all scenes within the four Environments. These scores were then used to calculate the overall category, "Scenery," according to the published standardized point system (USDI-BLM, 1980). However, the point totals for Scenery classification were adjusted for the removal of the factor Adjacent Scenery (See Table 3).

Although the individual ratings were not uniform across subjects, a clear majority was present for each rating. Standard deviations were calculated as a measure of variability for each factor across the four Environments: Landform s=.82, Vegetation s=.78, Water s=.89, Color s=.60, Scarcity s=.68, and Cultural Modifications s=.62. These statistics evidenced an acceptable level of agreement across landscape types because no standard deviation was greater than 1.

Inter-factor correlations were calculated, and the results are presented in Table 7. The vast majority of the intercorrelations between the seven variables are moderately positive, with the highest loading for all variables occurring on the summated variable, Scenery. Two exceptions to this were the correlations between Water-Vegetation r=.04

Table 7. Correlations Between Ratings Within the Formal Aesthetic Judgment Condition

	LAND*	VEG	WATR	COLR	SCRC	CMOD	SCRY
LAND	1.00						
VEG	.33	1.00					
WATR	.25	.04	1.00				
COLR	.34	.49	.39	1.00			
SCRC	.18	.54	.38	.51	1.00		
CMOD	.26	.46	-.04	.30	.30	1.00	
SCRY	.57	.62	.52	.69	.60	.50	1.00

* **LAND**=Landform, **VEG**=Vegetation, **WATR**=Water, **COLR**=Color, **SCRC**=Scarcity, **CMOD**=Cultural Modifications, and **SCRY**=Scenery.

and Water-Cultural Modifications r=-.04, and indicated the absence of a relationship between the presence of water and the variety of vegetation or presence of cultural modifications. Otherwise, the majority of these correlations indicated a moderately positive relationship to each other.

Data Reduction

The data reduction stage involved running factor analyses within each Judgment condition across the four landscape types, producing method-specific factors. A second-order factor analysis was then used to extract trait and method factors from the first-order factors thereby deriving dimensions that transcend landscape type (Environment) and rating condition (Judgment). The goal of this stage was to determine if universal principles of aesthetic quality exist across different environments and methods of assessment.

Exploratory Factor Analysis

The exploratory factor analyses were used to identify common factors within each Judgment condition across all four Environments. For this exploratory stage, each rating within each judgment condition should emerge as an individual factor if it is truly independent of the other ratings within that condition. Therefore, one would expect that the number of factors emerging from such an analysis would equal the number of ratings that comprise the judgment condition.

A number of precautionary steps were initially taken in the first-order factor analyses to ensure compatibility with later analyses. A principal factors model with promax rotation was used in order to efficiently condense the

variables in each judgment condition and provide good simple structure (Gorsuch, 1983; Widaman, 1985). In addition, the squared multiple correlations were used for the prior communality estimates. A scree test and a minimum eigenvalue of 0 were used to assess as many factors as possible for each analysis. All first-order factor analyses were computed using the SAS FACTOR procedure (SAS Institute, 1985).

Preference Judgments. The standardized ratings for Aesthetic Quality, Personal Preference, and Scenic Beauty ratings across all four Environments were used. Only one factor was retained using both the scree and minimal eigenvalue criteria; Factor 1 had an eigenvalue of 2.81. The factor loadings for each rating on the emergent factor are presented in Table 8.

The result of this factor analysis supported the conclusion previously discussed in regard to the intercorrelations between the ratings: Aesthetic Quality, Personal Preference, and Scenic Beauty essentially represent the same construct. The high loadings for each rating and the absence of any other factor further evidenced that all three of these ratings were indicators of a single underlying construct.

Informational Judgments. The standardized ratings for Coherence, Complexity, Legibility and Mystery ratings

Table 8. Factor Loadings for First-Order Factor Analyses

Preference Judgment

	Factor 1
AQ*	.96
PP	.97
SB	.96

Informational Judgment

	Factor 1	Factor 2
CH	.39	.25
CM	.53	.52
LG	.87	-.08
MY	-.52	.59

Formal Aesthetic Judgment

	Factor 1	Factor 2
LAND	.51	-.02
VEG	.69	-.37
WATR	.46	.61
COLR	.72	.10
SCRC	.67	.04
CMOD	.50	-.40
SCRY	.94	.07

* **AQ**=Aesthetic Quality, **PP**=Personal Preference, **SB**=Scenic Beauty, **CH**=Coherence, **CM**=Complexity, **LG**=Legibility, **MY**=Mystery, **LAND**=Landform, **VEG**=Vegetation, **WATR**=Water, **COLR**=Color, **SCRC**=Scarcity, **CMOD**=Cultural Modifications, and **SCRY**=Scenery.

**

across all four Environments were used. Two factors were retained using both the scree and minimum eigenvalue criteria. Factor 1 had an eigenvalue of 1.48, and Factor 2 had an eigenvalue of .69. The factor loadings for each rating on the two emergent factors are presented in Table 8.

Since four factors did not emerge, the four ratings in the informational judgment condition were condensed into two common factors. By examining the two highest loadings, Factor 1 could be interpreted as the common factor of Understanding, as this common factor underlies the two ratings of Coherence and Legibility. Factor 2 could be interpreted as the common factor of Exploration, as this common factor links the two ratings of Complexity and Mystery (Kaplan & Kaplan, 1989). However, Complexity loaded higher on Factor 1 than Factor 2 and Coherence loaded positively on Factor 2, indicating that the two-factor result is not easily interpreted into either one of the theoretically based common factors of Kaplan's model (Kaplan, 1987).

Formal Aesthetic Judgments. The values for Landform, Vegetation, Water, Color, Scarcity, Cultural Modification, and Scenery ratings across all four Environments were used. Two factors were retained using both the scree and minimum eigenvalue criteria. Factor 1 had an eigenvalue of 3.05, and Factor 2 had an eigenvalue of .68. The factor loadings

for each rating on the two emergent factors are presented in Table 8.

Since seven factors did not emerge, the seven ratings of the formal aesthetic judgment condition were explained by two common factors. Examination of the loadings on Factor 1 indicated that this factor was representative of the formal aesthetic condition, as all seven ratings loaded highly positive, especially the composite variable "Scenery." Factor 2, however, had only one high positive loading (Water) and two moderately negative loadings (Vegetation and Cultural Modifications). In other words, the presence of water was highly desirable, but the lack of vegetational variety and number of cultural modifications were moderately undesirable. Factor 2 was interpreted as unique to the formal aesthetic judgment condition because this method included ratings specifically addressing the presence of water, vegetation and built structures.

Confirmatory Factor Analysis

The confirmatory factor analysis was used to determine whether the common factors identified within each judgment condition in the exploratory stage were similar across all three judgment conditions. For this confirmatory analysis, each factor was considered to be a trait x method unit (Widaman, 1985). In other words, the variance within each factor could be distinguished between variance attributable

to a common trait and variance due to the common method of measurement.

Factor scores for each of the five emergent common factors from the exploratory factor analysis were obtained, and a factor intercorrelation matrix was computed using the SAS CORR procedure (SAS Institute, 1985). A structural equations model specifying two independent trait factors and three method factors[14] was developed using the EQS causal modeling program (Bentler, 1989). A diagram of this model is presented in Figure 1.

This structural model, however, failed to converge upon a final solution for the five exploratory factor intercorrelation matrix. In part, the failure of this confirmatory analysis to converge upon a unique solution was due to the limited number of factors that emerged from the exploratory analysis. The five factor intercorrelation matrix could only vaguely reflect some of the relationships between all fourteen ratings across the preference, informational, and formal aesthetic judgment conditions. Therefore, the algorithm could not discover a unique solution based on associations implied--rather than explicit--in the intercorrelation matrix.

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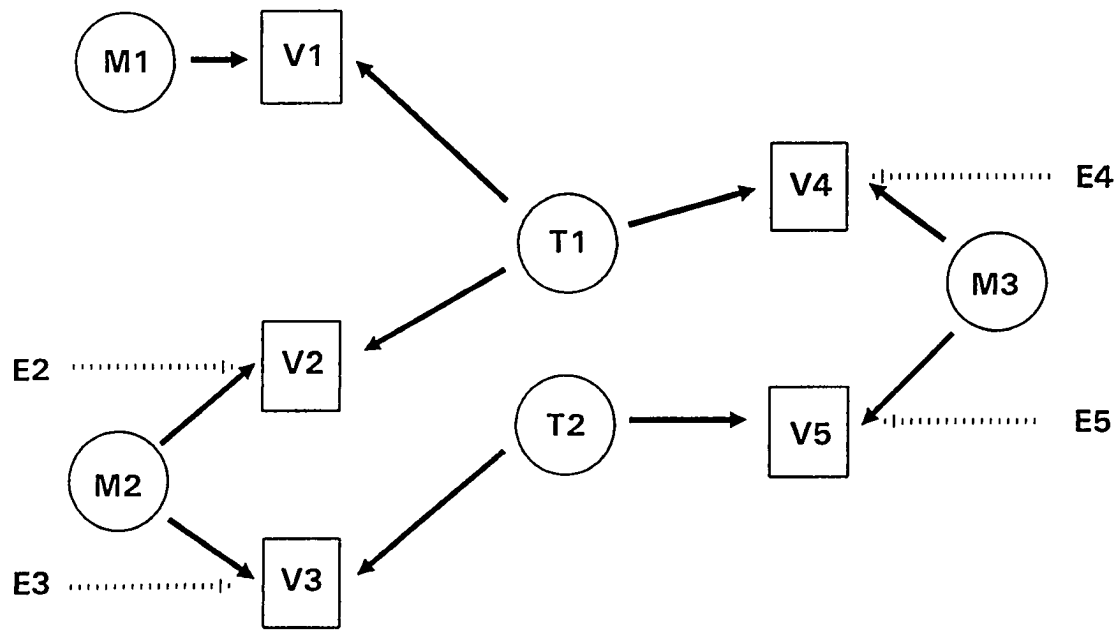
[14]Since only one factor emerged from the preference judgment condition, the error variance could not be partialled out of the method factor (Bentler, 1989).

Figure 1. Initial Structural Model



V1 = Factor 1, Pref, V2 = Factor 1, Info, V3 = Factor 2, Info, V4 = Factor 1, Expert, V5 = Factor2, Expert,
M1 = Naive Method, M2 = Psych Method, M3 = Expert Method, T1 = Beauty1, and T2 = Beauty2.

In order to make these relationships explicit for confirmatory analysis, the standardized scores for the fourteen ratings across the three judgment conditions were used rather than the five common factors. A covariance matrix[15] between all fourteen ratings was computed using the SAS CORR procedure (SAS Institute, 1985), and subsequently entered into the EQS modeling program (Bentler, 1989). A number of structural equation models were developed based on both exploratory results and theoretical hypotheses.

Three progressively restricted structural equation models were developed and tested in EQS. Model A, the least restricted model, is presented in Figure 2. Each rating was divided into both a trait factor and a method factor. In Model A, all fourteen ratings loaded directly on one common trait factor, while ratings nested within a Judgment condition loaded on the same method factor. In other words, Model A was a mono-trait (viz., Beauty) and hetero-method structural model.

The second structural equations model, Model B, is more restrictive than Model A, and is presented in Figure 3. Like Model A, Model B distinguishes between trait and method factors for each rating, using the same method factors as

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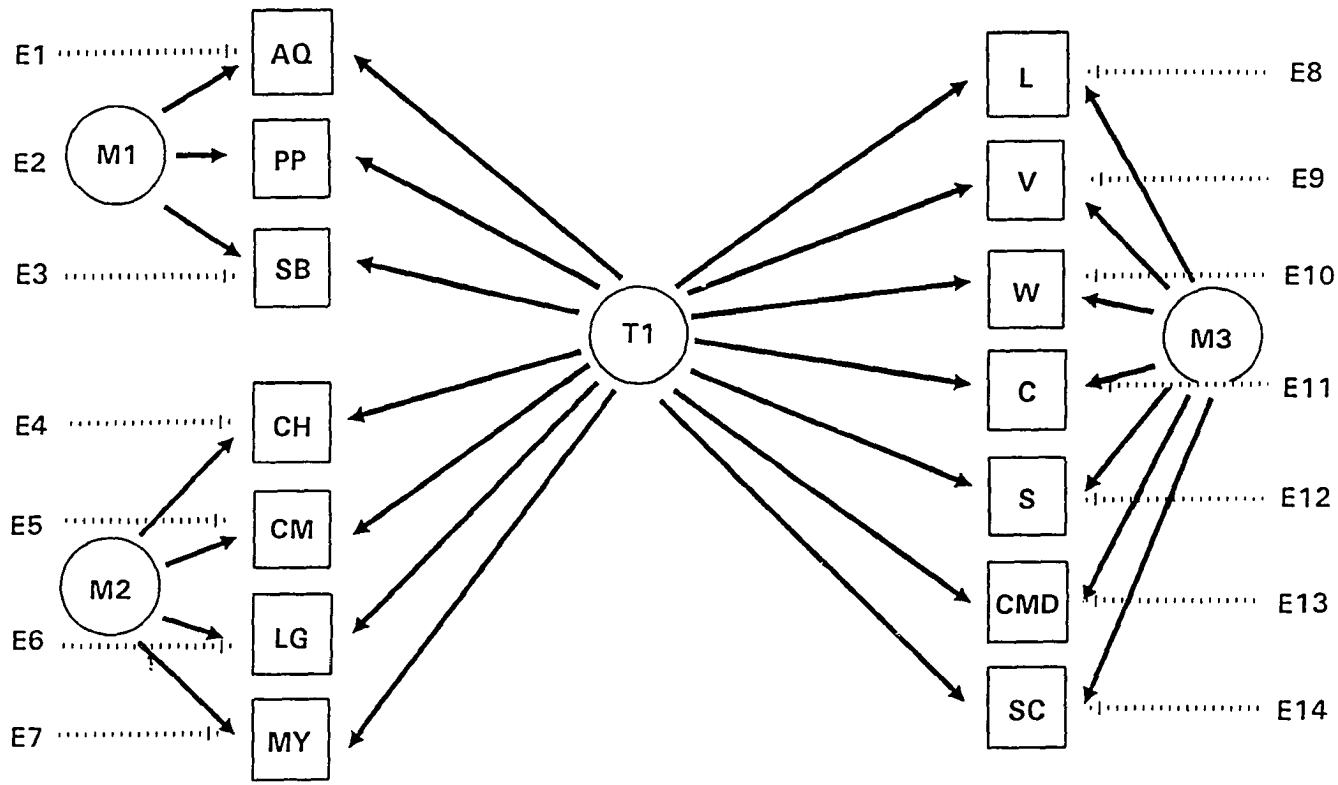
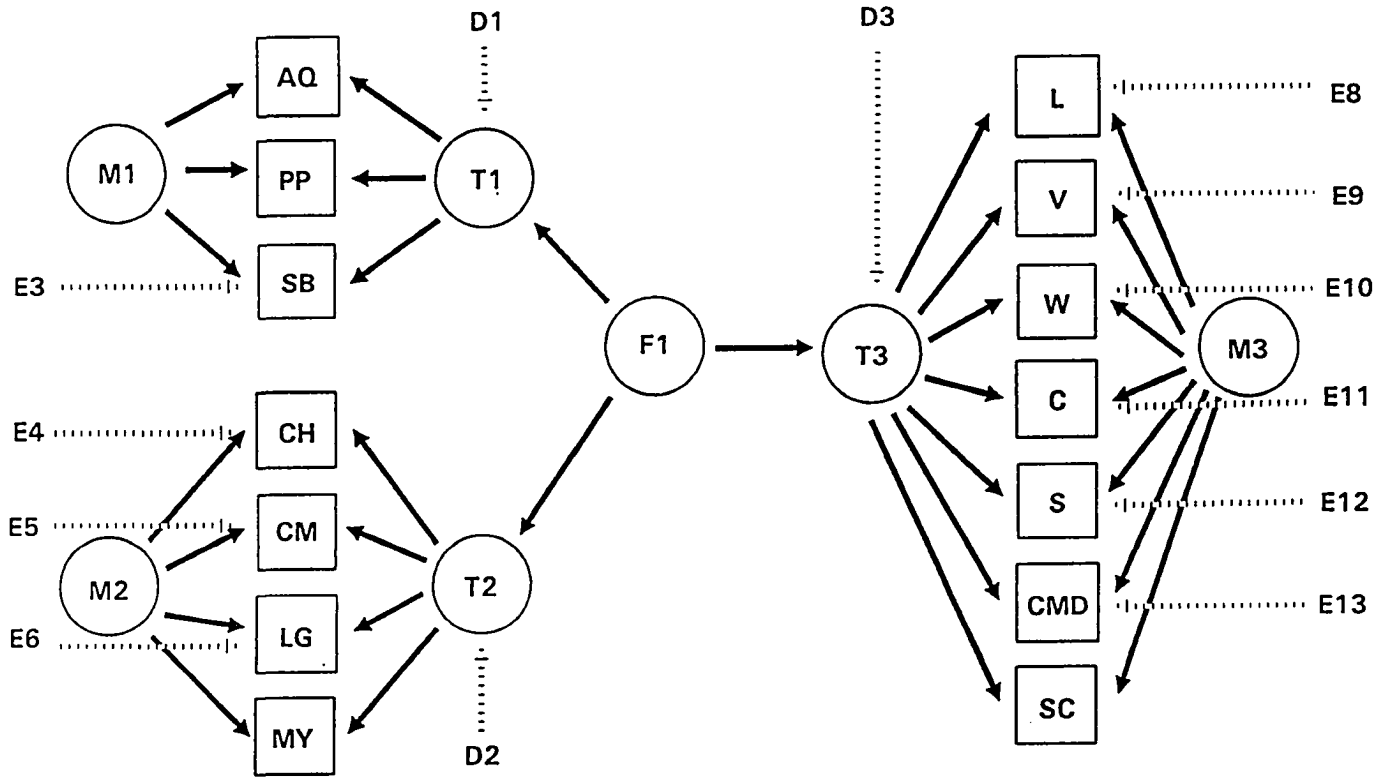
[15]Covariance matrices are preferred in any factor analysis because correlations are standardized according to the sample used (Gorsuch, 1983). The five factor matrix was a correlation matrix because factor scores are always standardized.

Figure 2. Least Restrictive Model ("A")



AQ = Aesthetic Quality, PP = Personal Preference, SB = Scenic Beauty, CH = Coherence, CM = Complexity, LG = Legibility, MY = Mystery, L = Landform, V = Vegetation, W = Water, C = Color, S = Scarcity, CMD = Cultural Modifications, SC = Scenery, M1 = Naive Method, M2 = Psych Method, M3 = Expert Method, T1 = Beauty.

Figure 3. Accepted Structural Equations Model ("B")



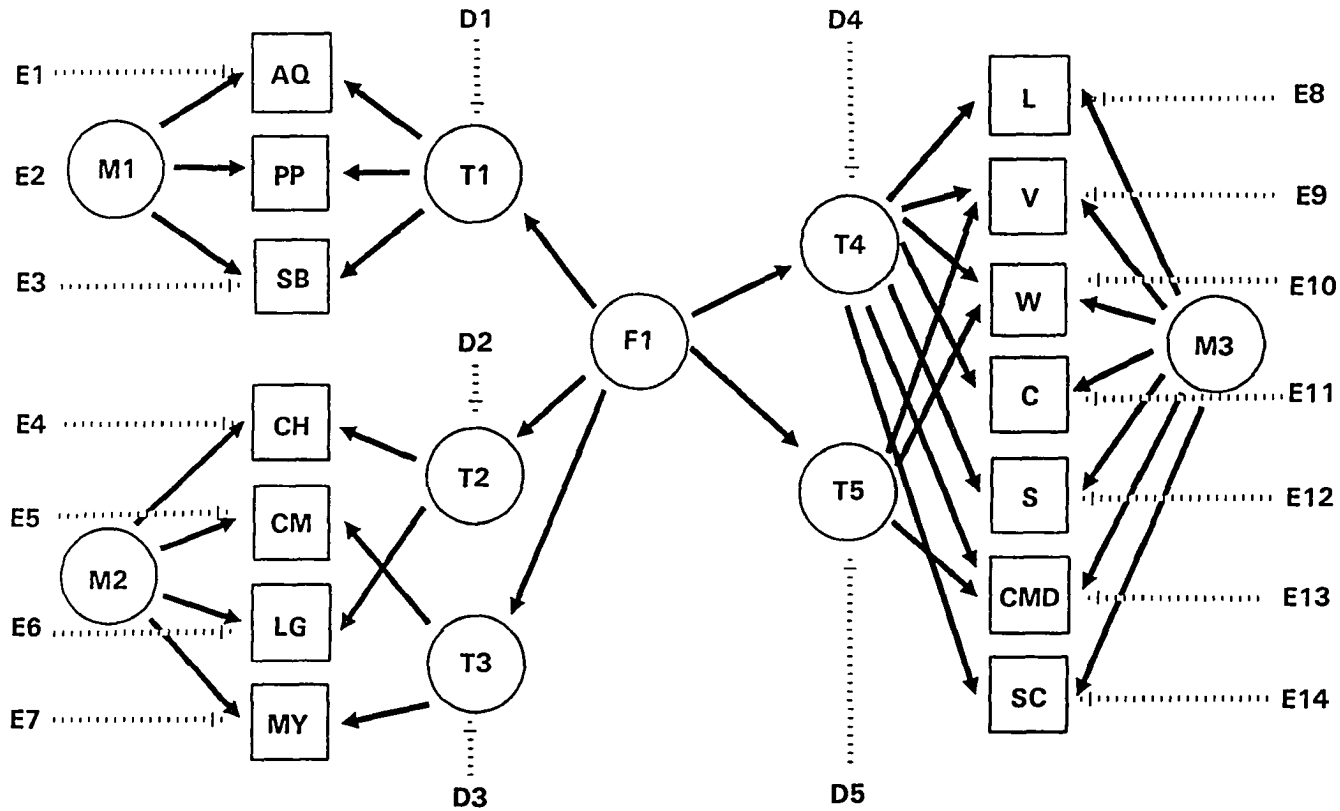
AQ = Aesthtic Quality, PP = Personal Preference, SB = Scenic Beauty, CH = Coherence, CM = Complexity, LG = Legibility, MY = Mystery, L = Landscape, V = Vegetation, W = Water, C = Color, S = Scarcity, CMD = Cultural Modifications, SC = Scenery, M1 = Naive Method, T1 = Naive Trait, M2 = Psych Method, T2 = Psych Trait, M3 = Expert Method, T3 = Expert Trait, F1 = Beauty.

specified in the least restrictive model. However, Model B was more restrictive because each rating must load on lower-order trait factors before loading on the single common factor. Ratings loading on the same lower order trait factors, as with the method factors, were nested within the same judgment condition (see Figure 3). Although more restricted than Model A, Model B was still considered to be a mono-trait (viz., Beauty) and hetero-method structural model.

The final structural equations model, Model C, was the most restrictive of the models considered. Model C, as presented in Figure 4, was considered a hetero-trait, hetero-method structural equations model because not all trait factors loaded on the single common trait factor (viz., Beauty). Method factors were specified similarly to Models A and B, but trait factors were specified according to the exploratory factor analysis previously computed.

These confirmatory factor models were initially evaluated by the comparative chi-squared, Bentler-Bonnet Comparative Fit Index (CFI) and the Bentler-Bonnet NonNormed Fit Index (NNFI). The chi-squared is a measure of the goodness-of-fit of the observed covariance matrix in relation to the one reproduced by the structural model. By subtracting the chi-squared of one model from another, the resultant chi-squared statistic is an indicator of any loss

Figure 4. Most Restrictive Model ("C")



AQ = Aesthetic Quality, PP = Personal Preference, SB = Scenic Beauty, CH = Coherence, CM = Complexity, LG-Legibility, MY = Mystery, L = Landform, V = Vegetation, W = Water, C = Color, S = Scarcity, CMD = Cultutal Modifications, SC = Scenery, M1 = Naive Method, M2 = Psych Method, M3 = Expert Method, T1 = Naive Trait, T2 = Understanding, T3 = Exploration, T4 = Expert Trait, T5 = Water/CMD, F1 = Beauty.

in the goodness-of-fit. A significant chi-squared between two competitive models indicates a loss of goodness-of-fit, while a non-significant chi-squared between two competitive models indicates no loss of goodness-of-fit. The CFI and NNFI are also indicators of goodness-of-fit, adjusted for large sample sizes (Bentler, 1989).

Comparisons across these three indices are summarized in Table 9 for Models A and B. Model C (the most restrictive model) and its numerous reincarnations were unable to produce a solution due to empirical underidentification (Bentler, 1989). The significant chi-squared difference between Model A and Model B signified that Model B provided a significantly better goodness-of-fit for the original covariance matrix than Model A. Model B was accepted as the best model because it specified a smaller number of factor intercorrelations that better reproduced the original data than Model A.

Nonsignificant parameter estimates for the error loadings were set to zero with no discernable influence on the rest of the parameters. Table 10 contains all of the non-zero parameter estimates of the three trait factors, three method factors, and one higher-order factor across all fourteen ratings obtained for Model B. For the <u>preference</u> judgment condition, the three ratings of Aesthetic Quality, Personal Preference, and Scenic Beauty load high (.97 to

Table 9. Factor Model Comparisons

Model	CHI^2	DF	$P(H_0)$	CFI	NNFI
A	214.75	63	.001	.999	.998
B	193.32	66	.001	.999	.998
A-B	21.43	3	.001	.000	.000

.99) on the common trait factor (Naive trait), but very low (-.19 to .10) on the common method factor (Naive method). This would confirm the initial exploratory result that these three ratings did indeed measure, to a highly reliable degree, some common aesthetic trait of preference without much interference from the method of measurement.

The informational judgment condition, however, required more careful consideration in interpretation. The four ratings of Coherence, Complexity, Legibility, and Mystery all loaded in a positive direction on the common trait factor, but were much lower in strength. Coherence and Complexity, which loaded positively on both psychological judgment factors in the exploratory factor analysis, have the largest loadings (.88 and .55 respectively) on the common trait factor. Mystery and Legibility, however, had much depreciated loadings on the common trait factor in relation to their loadings on the two exploratory factors. This could in part be due to the fact that both of their loadings on the two exploratory factors, although high, were in different directions (i.e., one positive and the other negative).

Similarly, the loadings for the common method factor for the informational ratings were highly variable, but were not in the same direction. Mystery loaded in a highly negative direction (-.94), while Legibility loaded in a

highly positive direction (.77) on the common method factor. In the Kaplans' preference model, Coherence and Mystery are diametrically opposite, and do not share any common element (viz., type of information or type of interaction). Coherence, which shares type of interaction with Legibility, loaded moderately (.29) in a similar direction with Legibility. Complexity, which shares type of interaction with Mystery, loaded in a very slightly similar (-.08) direction with Mystery.

These results confirmed the initial exploratory result that these four ratings do indeed measure, to a variable degree, some common trait of information (denoted in Table 10 as the Psych trait). In addition, the loadings on the common method of information (denoted in Table 10 as the Psych method) conformed, to a variable degree, to previously specified theoretical relationships (see Kaplan & Kaplan, 1989).

For the formal aesthetic judgment condition, the six initial ratings of Landform, Vegetation, Water, Color, Scarcity, and Cultural Modifications loaded moderately to moderately high on the common trait factor (.58, .50, .72, .72, .64, and .39 respectively), but the summary rating, Scenery, loaded very highly (.97) on the common trait factor. These results would indicate that these seven ratings did indeed measure, to a variable degree, some

Table 10. Parameter Estimates for the Accepted Structural Model (Model "B")

AQ	=	.985*F1	+	-.174*F8		
PP	=	.989*F1	+	.159*F8		
SB	=	.961*F1	+	-.008*F8	+	.275 E3
CH	=	.874*F2	+	.292*F9	+	.389 E4
CM	=	.526*F2	+	-.077*F9	+	.847 E5
LG	=	.241*F2	+	.773*F9	+	.587 E6
MY	=	.316*F2	+	-.949*F9		
LAND	=	.581*F3	+	.094*F10	+	.809 E8
VEG	=	.499*F3	+	.479*F10	+	.723 E9
WATR	=	.720*F3	+	-.694*F10		
COLR	=	.715*F3	+	.103*F10	+	.691 E11
SCRC	=	.644*F3	+	.103*F10	+	.758 E12
CMOD	=	.391*F3	+	.499*F10	+	.774 E13
SCRY	=	.974*F3	+	.226*F10		
NAIV	=	.981*F7	+	.196 D1		
PSYC	=	.981*F7	+	.196 D2		
EXP	=	-.484*F7	+	.875 D3		

* **AQ**=Aesthetic Quality, **PP**=Personal Preference, **SB**=Scenic Beauty, **CH**=Coherence, **CM**=Complexity, **LG**=Legibility, **MY**=Mystery, **LAND**=Landform, **VEG**=Vegetation, **WATR**=Water, **COLR**=Color, **SCRC**=Scarcity, **CMOD**=Cultural Modifications, **SCRY**=Scenery, **NAIV**=Naive (Preference) Trait (F1), **PSYC**=Psych (Informational) Trait (F2), **EXP**=Expert (Formal Aesthetic) Trait (F3), **F7**=Beauty, **F8**=Naive Method, **F9**=Psych Method, **F10**=Expert Method, **E**=Error Term, and **D**=Disturbance Term.

common formal aesthetic trait (denoted in Table 10 as the Expert trait). In addition, this common trait was also very similar to the first factor extracted in the exploratory analysis.

The seven ratings in the formal aesthetic judgment condition loaded in a more variable manner on the common method factor. Loadings for Landform, Color, Scarcity, and Scenery were low on the common method factor (.09, .10, .10, .29 respectively), but Vegetation, Water, and Cultural Modifications loaded comparatively higher (.48, -.69, and .50 respectively) on the common method factor in relation to the other ratings in this judgment condition. In other words, the variety of vegetation, the presence of water, and absence of human structures were prominent elements of the common method factor. When compared to the loadings on the second factor in the initial exploratory factor analysis, however, these results confirm the existence of a similar factor that is a common method to the formal aesthetic condition (denoted in Table 10 as the Expert method).

For the single higher-order factor (Beauty), only trait factors were allowed to be associated. In addition, the Naive and Psych traits required an equality constraint such

that each loaded equally on the higher-order factor.[16] The resulting coefficients for the Naive, Psych, and Expert traits were .98, .98, and -.48, respectively. The obvious difference between these traits was the highly positive loading for both the Naive and Psych traits (.98) and the moderately negative loading for the Expert trait (-.48). This result, however, was expected because the scale of measurement in the formal aesthetic judgment conditions was inverted in relation to the preference and informational judgment conditions (i.e., a "1" was highest in the formal aesthetic condition, while a "1" was lowest in both the preference and information conditions).

This result, therefore, meant that similar constructs existed between naive and expert observers, regardless of method of measurement. However, the difference between the high loadings of the Naive and Psych traits and the moderate loading of the Expert trait indicate a significant decrement in the overall reliability of the formal aesthetic method compared to the preference and information judgments. This result was similar to previous research which had found the Visual Resource Management systems to be a less reliable

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[16]The equality constraint was tested for significance using a Lagrange Multiplier Test ($CHI^2(1)=.243$, $p=.62$).

predictor of landscape preferences for naive observers (Feimer et al., 1979; Miller, 1984).

The discrepancy between the Naive and Psych trait loadings and the Expert trait loading on Beauty was also interesting in light of the highly positive correlations between preference judgments from both naive and expert-observer groups (see Table 5). When employing a similar judgment condition, expert-observers produced responses almost identical to naive-observers, but exhibited less reliable results when employing the formal aesthetic judgments.

Factor Association

The factor association stage involved running multiple regression analyses to determine if Beauty, the higher-order factor from the confirmatory analysis, could be predicted from the physical data of each landscape type. Since different physical data were collected for each landscape type, four different regression analyses needed to be conducted within landscape type. The unique biases of each judgment condition were identified in relation to the resultant regression equations. The goal of this stage was to determine if physical measures of the environment could be used to predict the common factor, Beauty.

Alaska Stimuli

The physical data for the sixty experimental scenes in the Alaska Environment condition were based on identifiable landscape features of forest vistas, which were classified and measured on photographs according to published methodology (Shafer et al., 1969; Buhyoff et al., 1982). Twenty-two different landscape features were identified, including sky, moving water, still water, rolling mountains, and beetle-damaged trees (See Table 11 for entire list). Within each landscape feature, three different distance classes (foreground, midground, and background) were identified in accordance with previous definitions (Buhyoff et al., 1982).

Table 11. Landscape Features by Distance Class Matrix.

	Distance Classes		
Landscape Features	Foreground	Midground	Background
Insect Damage			
Red (Newly Killed)	x	x	x
Grey (Old Kill)	x	x	x
Vegetation			
Conifer	x	x	x
Deciduous	x	x	x
Scrub	x	x	x
Grass	x	x	x
Flowers	x		
Driftwood	x	x	
Other Natural Features			
Rocks	x	x	x
Bare Soil	x	x	x
Snow		x	x
Still Water	x	x	
Still Glacial* Wtr	x	x	
Moving Water	x	x	
Moving Glacial* Wtr	x	x	
Man-Made Features			
Structures/Roads	x	x	
Topography			
Rolling Mountains		x	x
Sharp Mountains			x
Flat			
Hills		x	x
Sloped	x	x	x
Indeterminate	x	x	x
Other			
Sky	measured irrespective of distance		
Clouds	measured irrespective of distance		

* The presence of glacial silt in some of the streams, rivers, and lakes in Alaska causes the water to appear a bright, pale blue, which is distinctive from the other, non-glacial bodies of water.

The twenty-two landscape feature by three distance class matrix defined sixty-six possible categories of elements that could appear in each scene. Since some landscape feature/distance class cells did not occur (e.g., mountains or snow in foreground), fifty-two cells were finally measured for each scene (Table 11). Scenes were projected onto a 56" x 84" grid pattern, with each cell measuring 1.75" by 1.75." Landscape features by distance class were identified[17] and recorded for each cell within all sixty experimental scenes.

The six first-order (trait and method) factors and one second-order factor that emerged from the data reduction stage were specified using the standardized scores across all judgment conditions for the Alaska stimuli using the Confirmatory Multiple Group Factor Analysis in UNIMULT (Gorsuch, 1991). This program allows the user to specify variables, weights, and communalities for first- and second-order common factors, and produced a factor pattern very similar to the confirmatory model previously adopted across the four landscape types (Table 12).

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[17]The rule of thumb adopted for identification within cells that contained more than one landscape feature/distance class was a 50% rule. To be identified, each cell had to contain at least 50% of one feature X class property.

Table 12. Reproduced Factor Patterns within Environment

	AK *	EV	NV
AQ	.92	.91	.94
PP	.92	.91	.93
SB	.91	.91	.93
CH	.85	.88	.80
CM	.57	-.08	.32
LG	.50	-.67	.45
MY	.43	.75	.53
LAND	-.27	-.52	.07
VEG	-.27	-.49	-.61
WATR	-.30	-.47	.01
COLR	-.41	-.42	-.52
SCRC	-.75	-.75	-.61
CMOD	.23	-.62	.00
SCRY	-.20	-.69	-.58

* **AK**=Alaska, **EV**=Eastern Valley, **NV**=Nearview Forest, **AQ**=Aesthetic Quality, **PP**=Personal Preference, **SB**=Scenic Beauty, **CH**=Coherence, **CM**=Complexity, **LG**=Legibility, **MY**=Mystery, **LAND**=Landform, **VEG**=Vegetation, **WATR**=Water, **COLR**=Color, **SCRC**=Scarcity, **CMOD**=Cultural Modifications, and **SCRY**=Scenery.

Twenty-three of the fifty-two landscape features by distance class variables were selected *a priori* based on previous research findings and intuition (Buhyoff et al., 1982). Using the Hierarchical Multiple Regression Analysis in UNIMULT, Beauty--the second-order factor--was specified as the dependent variable, and the twenty-three physical variables were entered as independent variables. Retention of variables was based on reported effect size or semi-partial correlation,[18] in order to protect the overall variance explained by the model.

Seven physical variables were eventually retained (Table 13) in the overall best model (R^2=.54, df=7, F=4.49, p<.001). Moving water in the midground, still water in the midground, and still glacial water in the foreground all had a significant positive effect on Beauty. Deciduous trees in the midground, red damage trees in the foreground, and grey damage trees in the midground all had a negative, but nonsignificant, effect on Beauty. Red damage trees in the midground had a nonsignificant positive effect on Beauty.

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[18]Using strict hypothesis testing criteria (e.g., significance) in hierarchical or sequential multiple regression analyses may eliminate spurious variables that in and of themselves are not significant, but do increase the R^2 or shrunken R (Pedhazur, 1982).

Table 13. Multiple Regression Analysis for Alaska Stimuli

Variable	Effect Size	Sum of Squares	df	Mean Square	F Ratio	p
MWM*	r= .32	6.16	1	6.16	8.57	.01
SWM	r= .29	5.17	1	5.17	7.20	.01
SGF	r= .23	3.22	1	3.22	4.48	.04
DEM	r=-.20	2.37	1	2.37	3.30	.07
RDF	r=-.20	2.33	1	2.33	3.24	.07
RDM	r= .17	1.82	1	1.82	2.54	.11
GYM	r=-.16	1.53	1	1.53	2.13	.15
ERROR		37.38	52	.72		
MODEL	R=.61	22.62	7	3.23	4.49	.001
	R^2=.54	N=60				

BEAUTY = .03**MWM** + .005**SWM** + .001**SGF** -.001**DEM** - .007**RDF** + .004**RDM** - .001**GYM**.

* **MWM**=Moving Water-Midground, **SWM**=Still Water-Midground, **SGF**=Still Glacial Water-Foreground, **DEM**=Deciduous Trees-Midground, **RDF**=Red Damage-Foreground, **RDM**=Red Damage-Midground, and **GYM**=Grey Damage-Midground.

The resultant regression model in this study was similar to results reported in previous research regarding beetle-damaged trees (e.g., Buhyoff et al., 1982). Newly killed (red damage) trees are moderately liked if (1) they do not dominate the scene (2) if observers are uninformed as to why the trees are red. Red damage trees in the foreground, where observers could see the tree is both completely red and coniferous, were disliked, while red damage trees in the midground were moderately liked. Water, present in over half of the scenes, emerged to be the best predictor for Beauty over all sixty scenes.

To identify the particular biases of the first-order traits (viz., Naive, Psych, and Expert), a Hierarchical Linear Model Analysis or sequential canonical analysis was used in UNIMULT (Gorsuch, 1991). By prespecifying the order of the multiple dependent variables, this statistic avoids the previously discussed problems with the simultaneous estimation of parameters commonly employed in canonical analyses (Gorsuch, 1991). The second-order factor--Beauty--was entered as the first dependent variable, followed by the three first-order factors--Naive, Psych, and Expert[19] as dependent variables. The seven physical

[19]Although only one result is eventually reported for this analysis, all possible sequential combinations of the three first-order factors were computed.

variables that emerged from the multiple regression analyses (see Table 13) were entered as independent variables.

Since the second-order factor Beauty was entered first in the canonical analysis, the reported effect sizes and corresponding probabilities were identical to those previously reported in Table 13. Regardless of position entered, both the Naive and Psych first-order traits did not retain enough variance--above and beyond variance explained by Beauty--to be tested for significance (Table 14). In other words, no unique variance was left for the Naive and Psych traits to explain after Beauty had been partialled out. The Expert trait, on the other hand, captured unique variance in the variable RDF--Red Damage Foreground--even after all of the variance for Beauty, Naive trait, and Psych trait had been partialled out.

For the Alaska stimuli, the first-order factors of Naive and Psych did not have any bias or unique variance above and beyond their contribution to the second-order factor--Beauty. The first-order factor of Expert, however, indicated a unique additional sensitivity toward red damage trees in the foreground that was not captured or explained by the higher-order factor of Beauty.

Table 14. Canonical Analysis of Alaska Stimuli

Variable	Effect Size	Pillai-Bartlett V	DF1	F Ratio or Chi Sq.	p
Dependent variable: BEAUTY					
MWM	r = .32	.14	1	8.57	< .005
SWM	r = .29	.12	1	7.20	< .01
SGF	r = .23	.08	1	4.48	.03
DEM	r =-.20	.06	1	3.30	.07
RDF	r =-.20	.06	1	3.24	.07
RDM	r = .17	.05	1	2.54	.11
GYM	r =-.16	.04	1	2.13	.14
Dependent variable: NAIVET					
MWM	r = .04	1.00	1	SSw = 0; no p computed	
SWM	r = .07	1.00	1	SSw = 0; no p computed	
SGF	r = .01	1.00	1	SSw = 0; no p computed	
DEM	r =-.10	1.00	1	SSw = 0; no p computed	
RDF	r =-.21	1.00	1	SSw = 0; no p computed	
RDM	r =-.14	1.00	1	SSw = 0; no p computed	
GYM	r =-.18	1.00	1	SSw = 0; no p computed	
Dependent variable: PSYCHT					
MWM NO df; SD = 0 or R = 1 w/prior variables; no p computed					
SWM NO df; SD = 0 or R = 1 w/prior variables; no p computed					
SGF NO df; SD = 0 or R = 1 w/prior variables; no p computed					
DEM NO df; SD = 0 or R = 1 w/prior variables; no p computed					
RDF NO df; SD = 0 or R = 1 w/prior variables; no p computed					
RDM NO df; SD = 0 or R = 1 w/prior variables; no p computed					
GYM NO df; SD = 0 or R = 1 w/prior variables; no p computed					
Dependent variable: EXPERTT					
MWM	r = .04	.00	1	.16	n. s.
SWM	r = .06	.01	1	.38	n. s.
SGF	r =-.03	.00	1	.12	n. s.
DEM	r = .14	.04	1	2.30	.13
RDF	r =-.33	.19	1	11.91	< .005
RDM	r = .04	.00	1	.17	n. s.
GYM	r = .13	.03	1	1.78	.2

* **MWM**=Moving Water-Midground, **SWM**=Still Water-Midground, **SGF**=Still Glacial Water-Foreground, **DEM**=Deciduous Trees-Midground, **RDF**=Red Damage-Foreground, **RDM**=Red Damage-Midground, and **GYM**=Grey Damage-Midground.

Eastern Valley Stimuli

The physical data for the fifty-six experimental scenes in the Eastern Valley condition were provided by the authors of the original Zube et al. (1975) study. In addition to the twenty-three landscape dimensions used in the initial predictive model, forty-two landscape dimensions had been identified and measured. Since the intent of this experiment was to replicate the results of the original study with the second-order factor Beauty, the additional landscape dimensions were ignored.

Quantitative values for the twenty-three landscape dimensions were obtained from topographic maps and aerial photographs (Zube et al., 1975). In the original study, two predictive equations were reported. The first predictive equation was based on forty-six of the fifty-six scenes, included only six predictors, and reported an R^2=61. The second predictive equation was based on twenty-nine of the most natural of the fifty-six scenes, included only six predictors (absolute relative relief was the only duplicated dimension), and reported an R^2=69.

The six first-order (trait and method) factors and one second-order factor that emerged from the data reduction stage were specified using the standardized scores across all judgment conditions for the Eastern Valley stimuli using

the Confirmatory Multiple Group Factor Analysis in UNIMULT (Gorsuch, 1991). This program allows the user to specify variables, weights, and communalities for first- and second-order factors, and produced a factor pattern very similar to the confirmatory model previously adopted across the four landscape types (Table 12).

The thirteen landscape dimensions used in both of the reported predictive equations in Zube et al. (1975) were selected. Using the Hierarchical Multiple Regression Analysis in UNIMULT, Beauty--the second-order factor--was specified as the dependent variable, and the thirteen physical variables were entered as independent variables. Retention of variables was again based on reported effect size or semi-partial correlation, in order to protect the overall variance explained by the model.

Four landscape dimensions were eventually retained (Table 14) in the overall best model (R^2=.62, df=4, F=9.58, p<.001). This regression model contained the first four predictors of the predictive equation based on forty-six scenes reported in Zube et al. (1975). In addition, the variance explained or R^2 for both equations was almost identical (R^2=.62 and R^2=.614, respectively). The predictive equation based on twenty-nine scenes reported in Zube et al. (1975) did not provide an adequate comparison

Table 15. Multiple Regression Analysis for Eastern Valley Stimuli

Variable	Effect Size	Sum of Squares	df	Mean Square	F Ratio	p
LUCOMPT*	r=-.49	13.31	1	13.31	21.23	.001
ABSRERF	r= .26	3.75	1	3.75	5.97	.02
WAEDDEN	r= .27	4.15	1	4.15	6.62	.01
HGHTCON	r=-.22	2.83	1	2.83	4.51	.04
ERROR		31.97	51	.63		
MODEL	R=.66	24.03	4	6.01	9.58	.001
	R^2=.62	N=56				

BEAUTY = -.69 - .001**LUCOMPT** + .001**ABSRERF** + .0002**WAEDDEN** + .0002**HGHTCON**.

* **LUCOMPT**=Land Use Compatibility, **ABSRERF**=Absolute Relative Relief, **WAEDDEN**=Water Edge Density, and **HGHTCON**=Height Contrast.

for this experiment due to the removal of the sub-urban scenes. The regression model reported in this study was very similar to the results reported in Zube et al. (1975), and therefore considered to be a direct replication of the predictive physical model.

To identify the particular biases of the first-order traits (viz., Naive, Psych, and Expert), a Hierarchical Linear Model Analysis or sequential canonical analysis was used in UNIMULT (Gorsuch, 1991). The second-order factor--Beauty--was entered as the first dependent variable, followed by the three first-order factors--Naive, Psych, and Expert traits--as dependent variables. The four physical variables that emerged from the initial multiple regression analysis (Table 15) were entered as independent variables.

Since the second-order factor Beauty was entered first in the canonical analysis, the reported effect sizes and corresponding probabilities were identical to those previously reported in Table 15. After the variance attributable to Beauty was partialled out, the Naive or Psych trait retained a statistically significant amount of variance in both the land use compatibility (LUCOMPT) and absolute relative relief (ABSRERF) variables. However, this result depended upon which trait was entered first after

Beauty in the linear equation[20] (Table 16). Since this variance was above and beyond the variance accounted for by Beauty, it indicated a unique bias or sensitivity of these two first-order traits to these variables.

However, the reported effect size for both LUCOMPT and ABSRERF, regardless of which first-order trait was entered first, was relatively small (LUCOMPT r=-.11 and ABSRERF r=.13). Although statistically significant, these effect sizes were approximately half the size of the effect sizes of the higher-order factor Beauty (Table 16). Hence, the Naive and Psych traits were uniquely sensitive to changes in land use compatibility and landscape relief, but not additionally influential in relation to Beauty.

The Expert trait, on the other hand, demonstrated a unique bias in the height contrasts between the dominant elements within a scene (HGHTCON) above and beyond variance attributable to Beauty, Naive, and Psych traits (Table 16). The strength of the effect size (r=-.22) was comparable to the loadings on the second-order factor Beauty, yet emerged in a different direction than the HGHTCON effect size on Beauty. This result indicated an insensitivity to changes in height contrast unique to the Expert trait that was

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[20]Table 16 illustrates the outcome if the Naive first-order trait was entered first in the equation. When the Psych first-order trait is entered first, no variance was left over for the Naive trait.

Table 16. Canonical Analysis of Eastern Valley Stimuli

Variable	Effect Size	Pillai-Bartlett V	DF1	F Ratio or Chi Sq.	p
Dependent variable: BEAUTY					
LUCOMPT	r =-.49	.29	1	21.23	< .0001
ABSRERF	r = .26	.10	1	5.97	.01
WAEDDEN	r = .27	.11	1	6.62	.01
HGHTCON	r = .22	.08	1	4.51	.03
Dependent variable: NAIVET					
LUCOMPT	r =-.11	.10	1	5.44	.02
ABSRERF	r = .13	.14	1	8.32	< .01
WAEDDEN	r =-.02	.00	1	.12	n. s.
HGHTCON	r =-.06	.03	1	1.60	.2
Dependent variable: PSYCHT					
LUCOMPT NO df; SD = 0 or R = 1 w/prior variables; no p computed					
ABSRERF NO df; SD = 0 or R = 1 w/prior variables; no p computed					
WAEDDEN NO df; SD = 0 or R = 1 w/prior variables; no p computed					
HGHTCON NO df; SD = 0 or R = 1 w/prior variables; no p computed					
Dependent variable: EXPERTT					
LUCOMPT	r =-.08	.01	1	.60	n. s.
ABSRERF	r =-.05	.00	1	.24	n. s.
WAEDDEN	r = .10	.02	1	.95	n. s.
HGHTCON	r =-.22	.09	1	4.92	.03

* **LUCOMPT**=Land Use Compatibility, **ABSRERF**=Absolute Relative Relief, **WAEDDEN**=Water Edge Density, and **HGHTCON**=Height Contrast.

comparable in strength to the initial effect size of the same variable on Beauty.

Nearview Forest Stimuli

The physical data for the 120 experimental scenes in the Nearview Forest condition, representing thirty different homogenous forest stands, were measured using common forest inventory techniques for each forest stand (Brown & Daniel, 1984). The complete set of physical data was condensed into twelve management-specific variables, such as number of ponderosa saplings (trees/acre), total herbage(lb./acre), >3" diameter downed wood (ft^3/acre), and pine basal area (ft^2/acre). These independent variables were originally used to develop three different predictive models for ratings of Scenic Beauty in Brown and Daniel (1984).

The six first-order (trait and method) factors and one second-order factor that emerged from the data reduction stage were specified using the standardized scores across all judgment conditions for the Nearview Forest stimuli using the Confirmatory Multiple Group Factor Analysis in UNIMULT (Gorsuch, 1991). This program allows the user to specify variables, weights, and communalities for first- and second-order factors, and produced a factor pattern very similar to the confirmatory model adopted across the four landscape types (Table 12).

All twelve of the physical indices used as independent variables in Brown and Daniel (1984) were selected for inclusion into the multiple regression equation. Using the Hierarchical Multiple Regression Analysis in UNIMULT, Beauty--the second-order factor--was specified as the dependent variable, and the twelve physical indices were entered as independent variables. Retention of variables was based on reported effect size or semi-partial correlation, in order to protect the overall variance explained by the model.

Three physical variables were eventually retained (Table 17) in the overall best model (R^2=.69, df=3, F=9.86, p<.001). The nonlinear function ($\cdot^{75}$) of total herbage weight (PDTOT75) and the number of ponderosa pines per acre greater than or equal to 24" diameter at breast height (PP24PL) were also significant in two of the predictive equations (Basic and Downed Wood) reported in Brown and Daniel (1984). Tree grouping was also a significant variable in the third model (Summary Variable) reported in Brown and Daniel (1984). The final regression model for this experiment was similar to results reported in Brown and Daniel (1984).

Table 17. Multiple Regression Analysis for Nearview Forest Stimuli

Variable	Effect Size	Sum of Squares	df	Mean Square	F Ratio	p
PDTOT75*	r= .45	6.17	1	6.17	11.44	.005
TG	r= .40	4.83	1	4.83	8.94	.01
PP24PL	r= .41	4.97	1	4.97	9.21	.01
ERROR		14.03	26	.54		
MODEL	R=.73	15.97	3	5.32	9.86	.001
	R^2=.69	N=30				

BEAUTY = -1.39 + .02**PDTOT75** + .312**TG** + .094**PP24PL**.

* **PDTOT75**=(Total Herbage Weight)$^{0.75}$, **TG**=Tree Grouping, and **PP24PL**=Ponderosa Pine ≥24" d.b.h.2

However, in Brown and Daniel (1984) the average number of physical indices across all three models was six, with a range of R^2=.32, .48, and .50. The predictive model presented in this study for the second-order factor Beauty only required three variables and produced an R^2=.69. A considerable amount of explanatory power was gained over the original predictive equations by identifying the higher-order factor of Beauty.

To identify the particular biases of the first-order traits (viz., Naive, Psych, and Expert), a Hierarchical Linear Model Analysis or sequential canonical analysis was used in UNIMULT (Gorsuch, 1991). The second-order factor--Beauty--was entered as the first dependent variable, followed by the three first-order factors--Naive, Psych, and Expert traits--as dependent variables. The three physical variables that emerged from the initial multiple regression analysis (Table 17) were entered as independent variables.

Since the second-order factor Beauty was entered first in the canonical analysis, the reported effect sizes and corresponding probabilities were identical to those previously reported in Table 17. After the variance attributable to Beauty was partialled out, the Naive or Psych trait retained a statistically significant amount of variance in both the nonlinear total herbage weight

(PDTOT75) and ponderosa pine greater than or equal to twenty-four inches at breast height (PP24PL) variables. This result, however, depended upon which trait was entered first after Beauty in the linear equation.[21]

However, the reported effect size for both PDTOT75 and PP24PL, regardless of which first-order trait was entered first, was relatively small in relation to initial effect sizes for Beauty (PDTOT75 r=.25 and PP24PL r=.18). Although statistically significant, these effect sizes were approximately half the size of the effect sizes of the higher-order factor Beauty (Table 18). Hence, the Naive and Psych traits were uniquely sensitive to changes in land use compatibility and landscape relief, but not additionally influential in relation to Beauty.

The Expert trait, however, demonstrated a unique bias in the nonlinear total herbage weight (PDTOT75) above and beyond variance attributable to Beauty, Naive, and Psych traits (Table 18). The strength of the effect size (r=.28) was closer to the initial effect size on the second-order factor Beauty than the reported effect size on the Naive trait, but not additionally influential in relation to Beauty.

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[21]Table 18 illustrates the outcome if the Naive first-order trait was entered first in the equation. When the Psych first-order trait is entered first, no variance was left over for the Naive trait.

Table 18. Canonical Analysis of Nearview Forest Stimuli

Variable	Effect Size	Pillai-Bartlett V	DF1	F Ratio or Chi Sq.	p
Dependent variable: BEAUTY					
PDTOT75	r = .45	.31	1	11.44	< .005
TG	r = .40	.26	1	8.94	< .005
PP24PL	r = .41	.26	1	9.21	< .005
Dependent variable: NAIVET					
PDTOT75	r = .25	.68	1	55.76	< .0001
TG	r = .05	.08	1	2.38	.12
PP24PL	r = .18	.52	1	28.61	< .0001
Dependent variable: PSYCHT					
PDTOT75	NO df; SD = 0 or R = 1 w/prior variables; no p computed				
TG	NO df; SD = 0 or R = 1 w/prior variables; no p computed				
PP24PL	NO df; SD = 0 or R = 1 w/prior variables; no p computed				
Dependent variable: EXPERTT					
PDTOT75	r = .28	.14	1	4.09	.04
TG	r =-.21	.08	1	2.18	.14
PP24PL	r =-.03	.00	1	.04	n. s.

* **PDTOT75**=(Total Herbage Weight)$^{0.75}$, **TG**=Tree Grouping, and **PP24PL**=Ponderosa Pine ≥24" d.b.h.

Southwest Stimuli

The physical datum for the sixty experimental scenes in the Southwest Environment condition were estimated visual ranges, which were calculated from target/sky contrast measurements. These measures of visibility were provided by Air Resource Specialists, Inc., and had an estimated uncertainty of approximately ± 20%. Each set of ten scenes varied across ten levels of visibility ranging from very clear (Visibility Range=380km) to very poor (Visibility Range=20km).

The first-order factors were specified using the standardized scores for all judgment conditions for the Southwest stimuli using the Confirmatory Multiple Group Factor Analysis in UNIMULT (Gorsuch, 1991). However, the second-order factor, Beauty, could not be specified due to communality violations.[22] A factor pattern resembling the confirmatory model previously adopted across the four landscape types could not be reproduced.

Using the Hierarchical Linear Model Analysis in UNIMULT, the three first-order trait factors were selected as dependent variables, and visibility was selected as the independent variable. Since a variable loaded sequentially

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[22]Computed loadings cannot be greater than the communalities provided by the researcher. The Naive Trait loading on Beauty was 1.07, but the highest estimate of loading available is 1.00.

higher than the others captures all of the common variance between all of the variables, all of the different combinations of the dependent variables were calculated.[23] If the Naive trait was entered last, all of the traits were significantly related to visibility. However, if the Naive trait was entered sequentially prior to either the Psych or Expert trait, each reported a nonsignificant effect size close to zero. In addition, if both the Psych and Expert traits were entered after the Naive trait, neither was significant. Since only the Naive trait preserved a significant amount of unique variance regardless of its position in the linear equation, it was selected to be entered first in the reported linear equation.

The final summary table for all of the dependent variables is presented in Table 19. Although the averaged multiple correlation across all three dependent variables was relatively large (R=.52) and significant, only the Naive trait (r=.90) provided the necessary variance for the model to be significant. When entered after the Naive trait, both the Psych trait (r=-.04) and Expert trait (r=-.09) were completely insensitive to changes in visibility. In other

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[23]This was not a problem with the other three landscape types because a higher-order common factor was specified and entered first into the linear equation. Beauty, therefore, captured all of the common variance between the Naive, Psych, and Expert traits, leaving nothing but unique variance attributable to the first-order factors.

words, the Naive trait could not only account for a unique portion of the common variance, but when placed prior to the other traits, could capture all of the remaining variance for itself.

These major differences between traits explained why a second-order variable could not have been created for the Southwest landscape type. The Naive trait had almost a perfect positive correlation between the ratings within the judgment condition and visibility, whereas the Psych and Expert traits were unable to display any unique relationship between the ratings within the judgment condition and visibility. No common variance by which to identify a higher-order factor could be found, and therefore Beauty could not be specified.

In light of the previous three successes in creating a second-order factor and predicting it from physical features of the environment, the results in the Southwest landscape type indicated that certain landscape assessment methods may be insensitive to critical environmental features. Without comparisons across landscape types, this limitation might not have been discovered.

Table 19. Multiple Regression Analysis for Southwest Stimuli

Variable	Effect Size	Pillai-Bartlett V	df	F Ratio	p
Overall(avg)	R= .52	.81	3	80.42	.0001
NaiveT*	r= .90	.80	1	228.38	.0001
PsychT	r=-.04	.01	1	.33	
ExpertT	r=-.09	.02	1	1.38	
	N=60				

* **NaiveT**=Naive Trait, **PsychT**=Psych Trait, and **ExpertT**=Expert Trait.

Discussion

The underlying strategy for this experiment was to derive fundamental aesthetic principles of landscapes through the integration of conventional methods of landscape assessment. This purpose was summarized by three basic questions: (1) What traits are being measured by the landscape assessments currently being used?, (2) Are these constructs independent of the methods used to assess them?, and (3) Can an integrative theory of environmental aesthetics be empirically developed? It seems appropriate to address each of these questions in turn, as the latter build on the former.

An initial concern for all three questions was to ensure the quality and integrity of the ratings gathered for all three judgment conditions. For the observer-based methods (viz., preference and informational judgments), no effect of presentation order was discernable, and the reliability coefficients were generally high and similar to those previously reported by other researchers. For the expert-based method (viz., the formal aesthetic), acceptable agreement levels across categories were obtained within the small sample. Since each judgment condition was conducted using appropriate published methodology, the collected data met all of the *a priori* criteria for acceptance.

The data reduction stage of this experiment addressed the first question regarding what traits are being measured by factor analyzing ratings within judgment condition across four distinct landscape types. If each rating within judgment condition was independent of the other ratings, numerous factors should have emerged from the factor analyses within judgment condition. However, only one significant factor (eigenvalue ≥ 1) was identified from each judgment condition.[24] This result indicated that common traits within judgment condition existed across landscape types, which provided the basis for additional investigation.

The data reduction stage addressed the question of whether these common traits were specific to the judgment condition or did higher-order traits exist between methods of measurement? For each judgment condition, a successful division of variance between trait and method was reported. Indeed, trait variance was distinguished, in varying amounts, from method variance, even though multiple traits failed to emerge within judgment conditions. A single, second-order trait--Beauty--was identified, and associated with the first-order trait from each judgment condition.

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[24]Although two factors were identified in both the informational and formal aesthetic judgment conditions, the second factor in each had an eigenvalue < 1.

However, the discrepancy between the high loadings of the Naive trait and Psych trait on Beauty and the moderate loading of the Expert trait on Beauty indicated that the common trait of the formal aesthetic judgment condition was considerably less reliable. Even though the emergent trait from the formal aesthetic judgment condition should not be interpreted as a different trait or construct, the lack of a strong loading from the Expert trait to Beauty and the high disturbance term for the Expert trait indicated that another latent construct may possibly exist.

The two rival assumptions underlying the use of expert-based assessments were both contested by these results. The assumption that professionals can be used as valid surrogates for the public preferences was mitigated by the moderate reliability of the Expert trait in relation to Beauty. The assumption that public preferences are either inadequate or inappropriate was also disputed by the moderate loading of the Expert trait on Beauty. The sensitivity and utility of the formal aesthetic method was limited because the validity of a measure cannot exceed its reliability. But, public preferences were neither entirely inadequate nor inappropriate because the moderate loading between the expert and naive-based traits indicated that some relationship existed between the two assessments.

The accepted structural model was a mono-trait,

hetero-method model, and provided clear evidence for convergence across the Naive, Psych, and Expert judgment conditions (i.e., convergent validity). No methods that proported to measure other traits were included in the design, so assessments of discriminant validity could not be made. However, the considerable difference in strength of the loadings between the Naive, Psych, and Expert traits on the indicator variables and the common trait Beauty indicated considerable differences in reliability across the different measures.

In consideration of the final question--Can an integrative theory of environmental aesthetics be developed empirically--three specific criteria were addressed. First, the methodological practices of the psychophysical, psychological, and formal aesthetic models had to meet accepted standards. Although previous attempts at integrating these methods (viz., Kaplan et al., 1989 and Gobster & Chenoweth, 1989) were unable to maintain this tenet, great efforts were taken to ensure that each of the three methods was conducted according to published definitions, procedures, and operations.

Second, the environments selected for this experiment were diverse in both landscape type and form. Previous attempts at integration employed landscapes that exhibited little variation, producing landscape-specific results

(Ribe, 1989). The landscapes selected for this experiment included a wide range of environments from Alaskan mountains to desert canyons, from fast glacial rivers to slow eastern rivers, and from ponderosa pine forests to sub-urban areas. Although an exhaustive sampling of possible landscape types was not provided (especially urban), a broad range of environments was represented by the stimulus selection.

Finally, exploratory results were subjected to rigorous confirmatory analysis. Confirmatory analyses were provided by two separate techniques: Confirmatory factor analysis and multiple regression analyses. The confirmatory factor analysis was used to determine whether the common factors identified within each judgment condition in the exploratory factor analysis were similar across judgment conditions. The similarity of loadings between the first factors from the exploratory analysis and the loadings on the first-order trait factors indicated considerable stability across analyses.

The second confirmation of the accepted structural model was the prediction of the second-order factor, Beauty, from the physical variables collected for each scene. For the two landscape types for which predictive equations had been conducted and reported (Eastern Valley and Nearview), the results in regard to variance explained (R^2) and

variables selected were very similar. The predictive equations for both the Alaska and Southwest landscape types produced easily interpretable and predictable results. Both the similarity of the factor pattern between the exploratory and confirmatory analyses and the similarity of predictive equations across different samples clearly indicated confirmation of the resultant structural model.

In addition, the consistency of the predictive equations within landscape type to prior equations provided evidence for criterion validity. Since the physical measures of the environments were external and independent of the measuring instruments (i.e., ratings within judgment conditions), the success of the regression equations in predicting Beauty from the physical variables indicated reasonable evidence for criterion or predictive validity. In other words, the single, second-order trait derived from the confirmatory factor analysis was related in an identifiable fashion to the physical properties of the landscape.

In light of these results, the three fundamental questions of this study can be addressed. Specification of both method and trait variance for each judgment condition across all four landscape types was successful by identifying what traits were being measured. A single, common higher-order trait linking all three judgment

conditions was discovered, which provided a "universal" construct of visual scenic quality for landscapes. Finally, the empirically determined structural equations model was confirmed across two different analyses.

In regard to the criteria for an integrative theory of environmental aesthetics proposed by Zube (1984), the accepted structural model bridged different methods of landscape assessment, specified relationships between quantitative and qualitative data, pertained to natural and sub-urban (but nôt urban) landscape types, and encompassed diverse geographic scales. The surprising result was that these elements could be explained by using a single higher-order factor, and not the multiple higher-order factors many researchers have theorized. Consequently, those methods which proport to transcend landscape types (i.e., psychological and formal aesthetic) failed to demonstrate consistency and sensitivity across the different environment conditions in this study.

The long-held belief in environmental aesthetics (e.g., Wohlwill, 1976; Gobster & Chenoweth, 1989) regarding the multi-faceted complexity of human aesthetic preferences needs to be re-examined. The continual addition of mediating variables (e.g., informational or formal aesthetic judgments) may not be necessary--nor required--to identify or explain aesthetic preferences. The results of this study

provided clear evidence that a single, universal aesthetic factor can be developed across different methods of measurement and landscape types. A fruitful approach to further investigating environmental aesthetics may be to direct attention toward identifying what general landscape features contribute and predict changes in preferences across different landscape types.

Appendix A

Aesthetic Quality - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND THE AESTHETIC QUALITY OF FOREST AREAS. AESTHETIC VISUAL QUALITY IS AN IMPORTANT ELEMENT IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION. HENCE, WE ARE NOT INTERESTED IN YOUR OWN PERSONAL PREFERENCES, BUT HOW YOU COMPARE THESE FOREST AREAS TO OTHER FOREST AREAS IN THE UNITED STATES.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS AESTHETIC QUALITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES LOW AESTHETIC QUALITY, AND A 10 INDICATES HIGH AESTHETIC QUALITY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE VISUAL AESTHETIC QUALITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST AESTHETIC WOULD RATE A 1, AND THE AREAS YOU FIND MOST AESTHETIC WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((**SHOW PREVIEWS**))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE VISUAL AESTHETIC QUALITY OF EACH SCENE.

Coherence - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COHERENCE OF DIFFERENT FOREST AREAS. THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COHERENCE AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF COHERENCE, AND A 5 INDICATES "A GREAT DEAL" OF COHERENCE.

ALL OF THE SCENES ARE RELATIVELY COHERENT, BUT WE ARE INTERESTED IN THE COHERENCE OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COHERENT WOULD RATE A 1, AND THE AREAS YOU FIND MOST COHERENT WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE COHERENCE OF EACH SCENE.

REMEMBER, THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

Complexity - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COMPLEXITY OF DIFFERENT FOREST AREAS. THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COMPLEXITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF COMPLEXITY, AND A 5 INDICATES "A GREAT DEAL" OF COMPLEXITY.

ALL OF THE SCENES ARE RELATIVELY COMPLEX, BUT WE ARE INTERESTED IN THE COMPLEXITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COMPLEX WOULD RATE A 1, AND THE AREAS YOU FIND MOST COMPLEX WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((**SHOW PREVIEWS**))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE COMPLEXITY OF EACH SCENE.

REMEMBER, THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

Legibility - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE LEGIBILITY OF DIFFERENT FOREST AREAS. THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS LEGIBILITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF LEGIBILITY, AND A 5 INDICATES "A GREAT DEAL" OF LEGIBILITY.

ALL OF THE SCENES ARE RELATIVELY LEGIBLE, BUT WE ARE INTERESTED IN THE LEGIBILITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST LEGIBLE WOULD RATE A 1, AND THE AREAS YOU FIND MOST LEGIBLE WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE LEGIBILITY OF EACH SCENE.

REMEMBER, THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

Mystery - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE MYSTERY OF DIFFERENT FOREST AREAS. THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS MYSTERY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF MYSTERY, AND A 5 INDICATES "A GREAT DEAL" OF MYSTERY.

ALL OF THE SCENES ARE RELATIVELY MYSTERIOUS, BUT WE ARE INTERESTED IN THE MYSTERY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST MYSTERIOUS WOULD RATE A 1, AND THE AREAS YOU FIND MOST MYSTERIOUS WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE MYSTERY OF EACH SCENE.

REMEMBER, THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

Personal Preference - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND PERSONAL PREFERENCES FOR DIFFERENT FOREST AREAS. THE PUBLIC'S PERSONAL PREFERENCES IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN INDICATE YOUR OWN PERSONAL PREFERENCE FOR EACH FOREST AREA AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES THAT YOU DISLIKED IT VERY MUCH, AND A 10 INDICATES THAT YOU LIKED IT VERY MUCH.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN YOUR PERSONAL PREFERENCE OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU PERSONALLY LIKED THE LEAST WOULD RATE A 1, AND THE AREAS YOU PERSONALLY LIKED THE MOST WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE YOUR OWN PERSONAL PREFERENCE FOR EACH SCENE.

Scenic Beauty - Alaska

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE SCENIC BEAUTY OF FOREST AREAS. PUBLIC PERCEPTION IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN ALASKA. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS SCENIC BEAUTY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES LOW SCENIC BEAUTY, AND A 10 INDICATES HIGH SCENIC BEAUTY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE SCENIC QUALITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST BEAUTIFUL WOULD RATE A 1, AND THE AREAS YOU FIND MOST BEAUTIFUL WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((**SHOW PREVIEWS**))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE SCENIC BEAUTY OF EACH SCENE.

Aesthetic Quality - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND THE AESTHETIC QUALITY OF FOREST AREAS. AESTHETIC VISUAL QUALITY IS AN IMPORTANT ELEMENT IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION. HOWEVER, WE ARE NOT INTERESTED IN YOUR OWN PERSONAL PREFERENCES, BUT IN HOW YOU COMPARE THESE FOREST AREAS TO OTHER FOREST AREAS IN THE UNITED STATES.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS AESTHETIC QUALITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES LOW AESTHETIC QUALITY, AND A 10 INDICATES HIGH AESTHETIC QUALITY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE VISUAL AESTHETIC QUALITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST AESTHETIC WOULD RATE A 1, AND THE AREAS YOU FIND MOST AESTHETIC WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE VISUAL AESTHETIC QUALITY OF EACH SCENE.

Coherence - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COHERENCE OF DIFFERENT FOREST AREAS. THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COHERENCE AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF COHERENCE, AND A 5 INDICATES "A GREAT DEAL" OF COHERENCE.

ALL OF THE SCENES ARE RELATIVELY COHERENT, BUT WE ARE INTERESTED IN THE COHERENCE OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COHERENT WOULD RATE A 1, AND THE AREAS YOU FIND MOST COHERENT WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE COHERENCE OF EACH SCENE.

REMEMBER, THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

Complexity - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COMPLEXITY OF DIFFERENT FOREST AREAS. THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COMPLEXITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF COMPLEXITY, AND A 5 INDICATES "A GREAT DEAL" OF COMPLEXITY.

ALL OF THE SCENES ARE RELATIVELY COMPLEX, BUT WE ARE INTERESTED IN THE COMPLEXITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COMPLEX WOULD RATE A 1, AND THE AREAS YOU FIND MOST COMPLEX WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE COMPLEXITY OF EACH SCENE.

REMEMBER, THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

Legibility - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE LEGIBILITY OF DIFFERENT FOREST AREAS. THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS LEGIBILITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF LEGIBILITY, AND A 5 INDICATES "A GREAT DEAL" OF LEGIBILITY.

ALL OF THE SCENES ARE RELATIVELY LEGIBLE, BUT WE ARE INTERESTED IN THE LEGIBILITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST LEGIBLE WOULD RATE A 1, AND THE AREAS YOU FIND MOST LEGIBLE WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE LEGIBILITY OF EACH SCENE.

REMEMBER, THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

Mystery - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE MYSTERY OF DIFFERENT FOREST AREAS. THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS MYSTERY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF MYSTERY, AND A 5 INDICATES "A GREAT DEAL" OF MYSTERY.

ALL OF THE SCENES ARE RELATIVELY MYSTERIOUS, BUT WE ARE INTERESTED IN THE MYSTERY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST MYSTERIOUS WOULD RATE A 1, AND THE AREAS YOU FIND MOST MYSTERIOUS WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE MYSTERY OF EACH SCENE.

REMEMBER, THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

Personal Preference - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND PERSONAL PREFERENCES FOR DIFFERENT FOREST AREAS. THE PUBLIC'S PERSONAL PREFERENCES IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN INDICATE YOUR OWN PERSONAL PREFERENCE FOR EACH FOREST AREA AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES THAT YOU DISLIKED IT VERY MUCH, AND A 10 INDICATES THAT YOU LIKED IT VERY MUCH.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN YOUR PERSONAL PREFERENCE OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU PERSONALLY LIKED THE LEAST WOULD RATE A 1, AND THE AREAS YOU PERSONALLY LIKED THE MOST WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE YOUR OWN PERSONAL PREFERENCE FOR EACH SCENE.

Scenic Beauty - Eastern Valley

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE SCENIC BEAUTY OF FOREST AREAS. PUBLIC PERCEPTION IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE EASTERN UNITED STATES. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS SCENIC BEAUTY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES LOW SCENIC BEAUTY, AND A 10 INDICATES HIGH SCENIC BEAUTY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE SCENIC QUALITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST BEAUTIFUL WOULD RATE A 1, AND THE AREAS YOU FIND MOST BEAUTIFUL WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE SCENIC BEAUTY OF EACH SCENE.

Aesthetic Quality - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND THE AESTHETIC QUALITY OF FOREST AREAS. AESTHETIC VISUAL QUALITY IS AN IMPORTANT ELEMENT IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION. HOWEVER, WE ARE NOT INTERESTED IN YOUR OWN PERSONAL PREFERENCES, BUT HOW YOU COMPARE THESE FOREST AREAS TO OTHER FOREST AREAS IN THE UNITED STATES.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS AESTHETIC QUALITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES LOW AESTHETIC QUALITY, AND A 10 INDICATES HIGH AESTHETIC QUALITY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE VISUAL AESTHETIC QUALITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST AESTHETIC WOULD RATE A 1, AND THE AREAS YOU FIND MOST AESTHETIC WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE VISUAL AESTHETIC QUALITY OF EACH SCENE.

Coherence - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COHERENCE OF DIFFERENT FOREST AREAS. THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COHERENCE AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF COHERENCE, AND A 5 INDICATES "A GREAT DEAL" OF COHERENCE.

ALL OF THE SCENES ARE RELATIVELY COHERENT, BUT WE ARE INTERESTED IN THE COHERENCE OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COHERENT WOULD RATE A 1, AND THE AREAS YOU FIND MOST COHERENT WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE COHERENCE OF EACH SCENE.

REMEMBER, THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

Complexity - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COMPLEXITY OF DIFFERENT FOREST AREAS. THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COMPLEXITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF COMPLEXITY, AND A 5 INDICATES "A GREAT DEAL" OF COMPLEXITY.

ALL OF THE SCENES ARE RELATIVELY COMPLEX, BUT WE ARE INTERESTED IN THE COMPLEXITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COMPLEX WOULD RATE A 1, AND THE AREAS YOU FIND MOST COMPLEX WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE COMPLEXITY OF EACH SCENE.

REMEMBER, THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

Legibility - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE LEGIBILITY OF DIFFERENT FOREST AREAS. THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS LEGIBILITY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF LEGIBILITY, AND A 5 INDICATES "A GREAT DEAL" OF LEGIBILITY.

ALL OF THE SCENES ARE RELATIVELY LEGIBLE, BUT WE ARE INTERESTED IN THE LEGIBILITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST LEGIBLE WOULD RATE A 1, AND THE AREAS YOU FIND MOST LEGIBLE WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE LEGIBILITY OF EACH SCENE.

REMEMBER, THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

Mystery - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE MYSTERY OF DIFFERENT FOREST AREAS. THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS MYSTERY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A RATING OF 1 INDICATES "NOT AT ALL" OR ABSENCE OF MYSTERY, AND A 5 INDICATES "A GREAT DEAL" OF MYSTERY.

ALL OF THE SCENES ARE RELATIVELY MYSTERIOUS, BUT WE ARE INTERESTED IN THE MYSTERY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST MYSTERIOUS WOULD RATE A 1, AND THE AREAS YOU FIND MOST MYSTERIOUS WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((**SHOW PREVIEWS**))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE MYSTERY OF EACH SCENE.

REMEMBER, THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

Personal Preference - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND PERSONAL PREFERENCES FOR DIFFERENT FOREST AREAS. THE PUBLIC'S PERSONAL PREFERENCES IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN INDICATE YOUR OWN PERSONAL PREFERENCE FOR EACH FOREST AREA AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES THAT YOU DISLIKED IT VERY MUCH, AND A 10 INDICATES THAT YOU LIKED IT VERY MUCH.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN YOUR PERSONAL PREFERENCE OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU PERSONALLY LIKED THE LEAST WOULD RATE A 1, AND THE AREAS YOU PERSONALLY LIKED THE MOST WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((SHOW PREVIEWS))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE YOUR OWN PERSONAL PREFERENCE FOR EACH SCENE.

Scenic Beauty - Nearview

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE SCENIC BEAUTY OF FOREST AREAS. PUBLIC PERCEPTION IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF FOREST AREAS IN THE ROCKY MOUNTAINS. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED FOREST WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS SCENIC BEAUTY AT THE TIME THE SCENE WAS FILMED.

TO BEGIN WITH, I'M GOING TO SHOW YOU A SET OF PREVIEW SCENES, SO YOU CAN GET AN IDEA OF THE RANGE OF AREAS THAT YOU'LL BE EVALUATING. WHEN YOU SEE THESE PREVIEW SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A RATING OF 1 INDICATES LOW SCENIC BEAUTY, AND A 10 INDICATES HIGH SCENIC BEAUTY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE SCENIC QUALITY OF ONE FOREST AREA AS COMPARED TO THE OTHERS, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST BEAUTIFUL WOULD RATE A 1, AND THE AREAS YOU FIND MOST BEAUTIFUL WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES. AFTER THE PREVIEW SCENES, YOU WILL BEGIN RATING THE NEXT SET OF SCENES ON YOUR RESPONSE SHEET .....((**SHOW PREVIEWS**))

NOW I'D LIKE YOU TO BEGIN RATING. EACH SCENE WILL BE SHOWN FOR ABOUT 8 SECONDS, WHICH IS NOT VERY LONG, BUT IT SHOULD BE LONG ENOUGH FOR YOU TO GET AN IMPRESSION OF THE VIEW AND TO RECORD YOUR RATING. AN INDICATOR TO THE LEFT OF THE SCREEN WILL HELP YOU KEEP YOUR PLACE ON THE RATING SHEET.

PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE RELATIVE SCENIC BEAUTY OF EACH SCENE.

Aesthetic Quality - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE AESTHETIC QUALITY OF DIFFERENT NATURAL AREAS. PUBLIC PERCEPTION IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION. HOWEVER, WE ARE NOT INTERESTED IN YOUR OWN PERSONAL PREFERENCES, BUT HOW YOU COMPARE THESE NATURAL AREAS TO OTHER NATURAL AREAS IN THE UNITED STATES.

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH NATURAL AREA FOR ITS AESTHETIC QUALITY AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE AESTHETIC QUALITY OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A 1 INDICATES LOW AESTHETIC QUALITY AND A 10 INDICATES HIGH AESTHETIC QUALITY.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN RATE THEM FOR THEIR AESTHETIC QUALITY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE AESTHETIC QUALITY OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST AESTHETIC WOULD RATE A 1, AND THE AREAS YOU FIND MOST AESTHETIC WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE VISUAL AESTHETIC QUALITY OF EACH SCENE.

Coherence - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COHERENCE OF DIFFERENT NATURAL AREAS. THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COHERENCE AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE COHERENCE OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A 1 INDICATES LOW AESTHETIC QUALITY AND A 5 INDICATES HIGH COHERENCE.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN RATE THEM FOR THEIR COHERENCE.

ALL OF THE SCENES ARE RELATIVELY COHERENT, BUT WE ARE INTERESTED IN THE COHERENCE OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COHERENT WOULD RATE A 1, AND THE AREAS YOU FIND MOST COHERENT WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE COHERENCE OF EACH SCENE.

REMEMBER, THE COHERENCE OF A VIEW IS CONSIDERED TO BE HOW EASY IT IS TO ORGANIZE AND STRUCTURE OR HOW WELL THE SCENE "HANGS TOGETHER."

Complexity - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE COMPLEXITY OF DIFFERENT NATURAL AREAS. THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS COMPLEXITY AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE COMPLEXITY OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A 1 INDICATES LOW AESTHETIC QUALITY AND A 5 INDICATES HIGH COMPLEXITY.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN RATE THEM FOR THEIR COMPLEXITY.

ALL OF THE SCENES ARE RELATIVELY COMPLEX, BUT WE ARE INTERESTED IN THE COMPLEXITY OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST COMPLEX WOULD RATE A 1, AND THE AREAS YOU FIND MOST COMPLEX WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE COMPLEXITY OF EACH SCENE.

REMEMBER, THE COMPLEXITY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH A SCENE CONTAINS MANY ELEMENTS OF DIFFERENT KINDS OR HOW MUCH THERE IS TO LOOK AT IN THE SCENE.

Legibility - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE LEGIBILITY OF DIFFERENT NATURAL AREAS. THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS LEGIBILITY AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE LEGIBILITY OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A 1 INDICATES LOW AESTHETIC QUALITY AND A 5 INDICATES HIGH LEGIBILITY.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN RATE THEM FOR THEIR LEGIBILITY.

ALL OF THE SCENES ARE RELATIVELY LEGIBLE, BUT WE ARE INTERESTED IN THE LEGIBILITY OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST LEGIBLE WOULD RATE A 1, AND THE AREAS YOU FIND MOST LEGIBLE WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE LEGIBILITY OF EACH SCENE.

REMEMBER, THE LEGIBILITY OF A VIEW IS CONSIDERED TO BE HOW EASY IT WOULD BE TO FIND ONE'S WAY AROUND IN THE ENVIRONMENT DEPICTED, TO FIGURE OUT WHERE ONE IS AT ANY GIVEN MOMENT, OR TO FIND ONE'S WAY BACK TO ANY GIVEN POINT IN THE ENVIRONMENT.

Mystery - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE MYSTERY OF DIFFERENT NATURAL AREAS. THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH FOREST AREA FOR ITS MYSTERY AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE MYSTERY OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A FIVE POINT SCALE -- WHERE A 1 INDICATES LOW AESTHETIC QUALITY AND A 5 INDICATES HIGH MYSTERY.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN RATE THEM FOR THEIR MYSTERY.

ALL OF THE SCENES ARE RELATIVELY MYSTERIOUS, BUT WE ARE INTERESTED IN THE MYSTERY OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 5-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST MYSTERIOUS WOULD RATE A 1, AND THE AREAS YOU FIND MOST MYSTERIOUS WOULD RATE A 5.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE MYSTERY OF EACH SCENE.

REMEMBER, THE MYSTERY OF A VIEW IS CONSIDERED TO BE THE EXTENT TO WHICH THE ENVIRONMENT DEPICTED PROMISES MORE TO BE SEEN IF YOU COULD WALK DEEPER INTO IT OR DOES THE ENVIRONMENT INVITE YOU TO ENTER MORE DEEPLY INTO IT AND THEREBY LEARN MORE?.

Personal Preference - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND PERSONAL PREFERENCES FOR DIFFERENT NATURAL AREAS. PUBLIC PERCEPTION IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION.

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN INDICATE YOUR OWN PERSONAL PREFERENCE AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE PERSONAL PREFERENCE OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A 1 INDICATES THAT YOU DISLIKED IT VERY MUCH AND A 10 INDICATES THAT YOU LIKED IT VERY MUCH.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN INDICATE YOUR OWN PERSONAL PREFERENCE.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE PERSONAL PREFERENCE OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU PERSONALLY LIKED THE LEAST WOULD RATE A 1, AND THE AREAS YOU PERSONALLY LIKED THE MOST WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE YOUR OWN PERSONAL PREFERENCE OF EACH SCENE.

Scenic Beauty - Southwest

THE PURPOSE OF THIS STUDY IS TO BETTER UNDERSTAND HOW PEOPLE PERCEIVE THE SCENIC BEAUTY OF DIFFERENT NATURAL AREAS. PUBLIC PERCEPTION IS AN IMPORTANT CONSIDERATION IN SELECTING FOREST AREAS FOR SPECIAL SCENIC DESIGNATION. HOWEVER, WE ARE NOT INTERESTED IN YOUR OWN PERSONAL PREFERENCES, BUT HOW YOU COMPARE THESE NATURAL AREAS TO OTHER NATURAL AREAS IN THE UNITED STATES.

I AM GOING TO SHOW YOU SOME SCENES OF NATURAL AREAS IN THE SOUTHWEST. THESE SCENES ARE NOT PROFESSIONAL, SO I'D LIKE YOU TO IGNORE PHOTOGRAPHIC QUALITY FACTORS SUCH AS EXPOSURE AND COLOR CONTROL. JUST USE EACH SCENE TO GET AN IMPRESSION OF WHAT THE REPRESENTED AREA WOULD BE LIKE IF YOU WERE THERE. YOU WILL THEN RATE EACH NATURAL AREA FOR ITS SCENIC BEAUTY AT THE TIME THE SCENE WAS FILMED.

I'M GOING TO SHOW YOU A SEVERAL SET OF COLOR SLIDES TAKEN IN THE SOUTHWEST. EACH SET OF SLIDES DEPICTS A DIFFERENT LANDSCAPE. HOWEVER, WITHIN EACH SET YOU WILL SEE SEVERAL DIFFERENT VERSIONS OR EXAMPLES OF THE SAME LANDSCAPE TAKEN AT DIFFERENT TIMES, WITH SUBTLE DIFFERENCES BETWEEN EACH VERSION IN SUCH THINGS AS LIGHTING, VISIBILITY, WEATHER AND OTHER CONDITIONS. IN THIS STUDY, WE ARE INTERESTED IN HOW THESE FACTORS AFFECT PERCEPTION OF THE SCENIC BEAUTY OF EACH AREA.

I WILL PREVIEW EACH LANDSCAPE BY SHOWING YOU ALL OF THE EXAMPLES OF THAT LANDSCAPE VERY QUICKLY. WHEN YOU SEE THESE SCENES, DON'T MARK ANYTHING ON YOUR RESPONSE SHEETS. JUST TRY TO IMAGINE HOW YOU WOULD RATE THEM ON A TEN POINT SCALE -- WHERE A 1 INDICATES LOW SCENIC BEAUTY AND A 10 INDICATES HIGH SCENIC BEAUTY.

AFTER I HAVE SHOWN YOU ALL OF THE VERSIONS OF A PARTICULAR LANDSCAPE, I WILL THEN SHOW YOU THE SAME SCENES MORE SLOWLY, SO YOU CAN RATE THEM FOR THEIR SCENIC BEAUTY.

ALL OF THE SCENES ARE RELATIVELY ATTRACTIVE, BUT WE ARE INTERESTED IN THE SCENIC BEAUTY OF EACH LANDSCAPE AS COMPARED TO THE OTHERS OF THE SAME AREA, SO PLEASE TRY TO USE THE FULL 10-POINT RANGE OF THE SCALE WHEN YOU MAKE YOUR RATINGS. IDEALLY, THE AREAS YOU JUDGE AS THE LEAST BEAUTIFUL WOULD RATE A 1, AND THE AREAS YOU FIND MOST BEAUTIFUL WOULD RATE A 10.

IF THERE ARE NO QUESTIONS, I WILL BEGIN TO SHOW THE PREVIEW SCENES OF THE FIRST LANDSCAPE. PLEASE BE CAREFUL TO RECORD YOUR RATING FOR EACH SCENE IN THE INDICATED SPACE ON YOUR RATING SHEET, AND AGAIN TRY TO USE THE FULL RANGE OF THE SCALE TO INDICATE THE VISUAL SCENIC BEAUTY OF EACH SCENE.

Appendix B. Sample of Formal Aesthetic Response Sheet

	Landform	Vegetation	Water	Color	Scarcity	Cultural Mod.
Scene #1						
Category	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
Scene #2						
Category	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
Scene #3						
Category	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
Scene #4						
Category	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
Scene #5						
Category	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3

	Landform	Vegetation	Water	Color	Scarcity	Cultural Modifications
Category 1	High vertical relief such as prominent cliffs, spires or massive rock outcrops; or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers.	A variety of vegetative types in interesting forms, textures, and patterns	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape.	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields.	One of a kind; or unusually memorable; or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing.	Free from esthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety.
Category 2	Steep canyons, mesas, buttes, cinder cones and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features present and interesting though not dominant or exceptional.	Some variety of vegetation, but only one or two types.	Flowing or still, but not dominant in the landscape.	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element.	Distinctive, though somewhat similar to others within the region.	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensively that they are entirely negated; or modifications add little or no visual variety to the area.
Category 3	Low, rolling hills, foothills or flat valley bottoms, interesting, detailed landscape features few or lacking.	Little or no variety or contrast in vegetation.	Absent, or not noticeable.	Subtle color variations, contrast or interest; generally muted tones.	Interesting within its setting, but fairly common within the region.	Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced.

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