4 Assessing Visual Preference for Louisiana River Landscapes

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Conceptual Approach

Visual preference in the landscape is related to a complex range of cultural, psychological, and environmental factors. Only recently have attempts been made to evaluate and examine visual preference to make it possible to incorporate this factor in the decision-making process. Previous attempts have focused on the examination of information or stimuli provided by the visual display. Such a process has long been used in the field of psychology. Recently, researchers have used this informational approach in an attempt to explain factors relevant to visual preference in the environment. This form of analysis is based on the theory that examination of the information presented in a scene can be used as a clue to the explanation of environmental preference.

Kevin Lynch (1960) in *The Image of the City* proposes the concept of imageability, which he defines as "that quality in a physical object which gives it a high probability of evoking a strong image in any given observer" (p. 9). Lynch attempts to build a theoretical model in his analysis of urban structure. This concept of imageability parallels many of the ideas pertinent to models related to the informational approach. The imageability of an object is dependent upon the visual information that is transmitted from the object to the individual. By examining imageability Lynch attempts to explain some of the factors contributing to human preference in the environment.

This concept relates strongly to the process of individual perception described by Wohlwill (1966) and Newby (1971). Wohlwill explains an individual's relationships with the environment in terms of levels of stimulation. Experiments with animals have demonstrated that living organisms develop differently under varying levels of sensory stimulation in the environment. Each individual develops what Wohlwill describes as an adaption level to the stimuli or information received from the environment. An individual's sensory experience in the environment is related to his ability to process this information based on individual experience or adaption level (Wohlwill, 1966, pp. 30–37).

Newby similarly describes human perception of the environment as incorporating "the interaction of man's senses into a system whereby he is able to adapt to a world of constantly changing environmental conditions" (Newby, 1971, p. 70). The isolation of the components involved in the processing of perceptual information is logically the key to understanding human informational processing. Newby identifies four variables as being important to the processing of the environmental stimulus: (1) order, (2) complexity, (3) edge, and (4) spatial definition (pp. 68–72).

Rachel Kaplan (1973, 1975) and Stephen Kaplan (1973, 1975), just as Lynch, Wohlwill, and Newby, attempt to explain the perceptual process in terms of informational processing. This theory suggests that examination of the information an environment provides can be used to isolate components relevant to individual preference.

The Kaplans identify two general variables that aid in the identification of factors important to visual preference. One variable concerns the order and structure apparent in the scene. These factors aid in the cognition and individual structuring of the visual display. The second set of variables are described as involvement or interest factors. A preferred environment is therefore one that people can organize perceptually and also become involved with (S. Kaplan, 1975, p. 94).

In contrast to the general theoretical framework provided by these informational studies are the more structured, statistically based experimental approaches. Through testing, researchers attempt to identify factors relevant to human visual preference and perception in the environment. These researchers often rely on adjective checklists and elaborate testing techniques to obtain results from respondent reactions to visual stimuli. A criticism of this approach is that often the information derived is difficult to apply to any method for the analysis of visual preference (R. Kaplan, 1975, pp. 119–20). This is because of the frequently fragmented nature of the results and the inability to produce any general principles or domains for preference evaluation (Levin, 1977, p. 1).

Despite this criticism, the informational and experimental approaches appear to complement each other in the creation of a model that attempts to analyze factors relevant to visual preference in the landscape. Through a detailed analysis of the fragmented results of the experimental approach, these factors or concepts identified as influencing visual preference in the landscape can be related to the theoretical structure proposed in the informational approach. The combination of these factors could provide a logical basis for the development of a model analyzing visual preference in the landscape. By using this approach, the model would combine statistically justifiable data with a sound theoretical model.

Specialized disciplines often fail to integrate pertinent information from other groups in preference studies. For example, designers often fail to realize that despite the "horror" of attempting to evaluate numerically and test factors relevant to environmental preference, significant behavioral findings should not be taken lightly. Too often designers have separated the significance of the art and the elements of design from the behavioral sciences. Similarly, scientists and technologists often have failed to recognize the relationships of science and technology to art and nature. Designers should not close their eyes to behavioral research, nor should the behaviorist fail to recognize the importance of the principles of design.

This study was an attempt to integrate information, ideas, and thoughts from several disciplines into a logical evaluative approach to the explanation of visual preference related to Louisiana river corridors. Despite this approach, many of the concepts indicated in this study may be of value in the evaluation of visual preference in other landscape types.

Study Description

This study focuses on the visual preference values associated with the river-swamp environment of southern Louisiana. Visual preference in any environment is regionally based. A river experience in Louisiana is different visually from other regions. While visual preference values change regionally with the variations in landscape character, regionally based cultural influences also affect visual preference. Before examining these regional preference values, the Louisiana river-swamp phenomenon must be identified and defined.

The Oxford Dictionary states that the word *stream* is a universal term for flowing water. Thus a river can be considered as a type of stream. In the United States a river is thought of as a fairly large flowing body of water whose

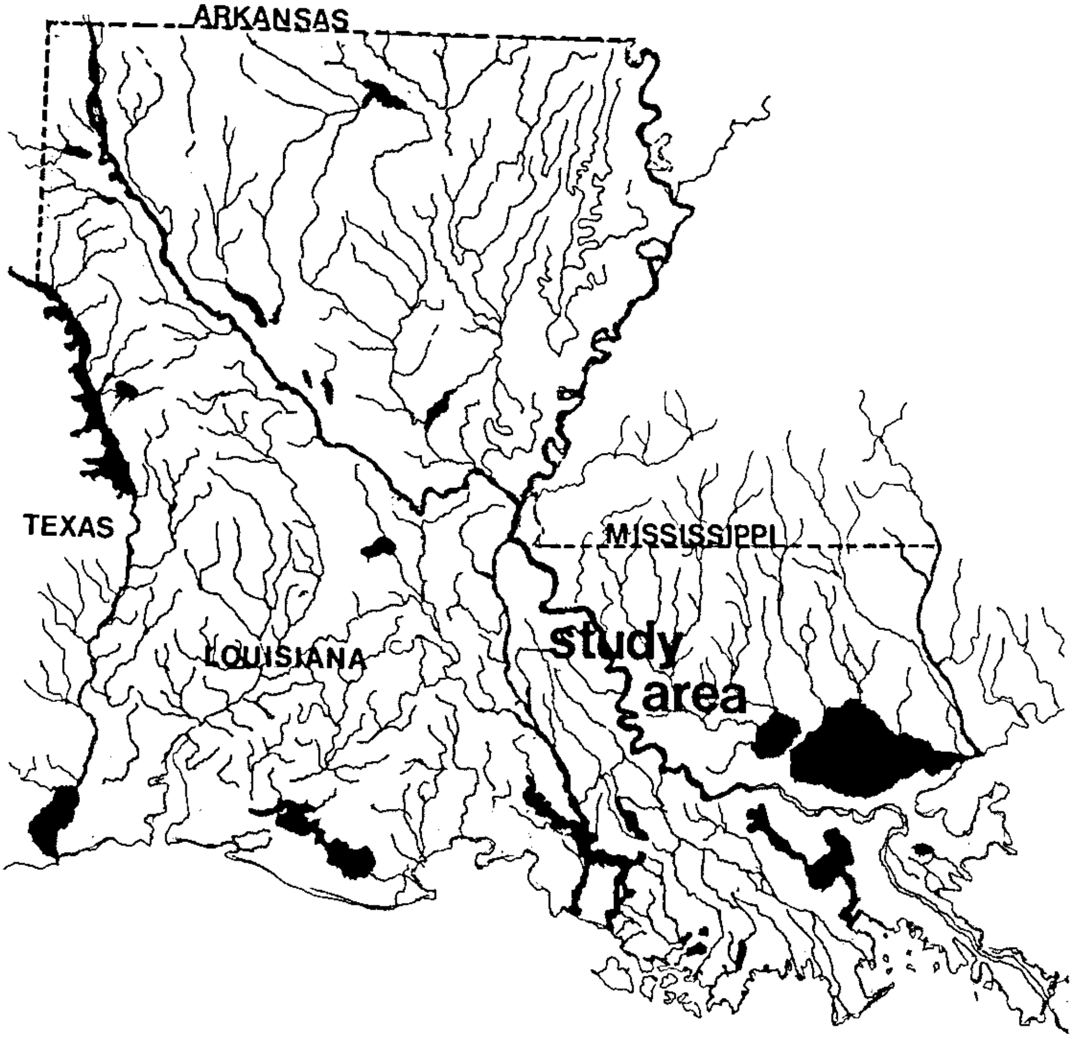

Figure 4.1. The study area.

character is determined by the geology, topography, soils, and land use of the watershed (Patrick, 1972, p. 67). The visual impression created by a river landscape is therefore an expression of a region's geological past and the relationship between water and the internal structure of the land.

Study Area

Louisiana is a part of the geologic region described as the Gulf Coastal Plain (Figure 4.1). Most of the plain is underlain by a series of sedimentary deposits dating from the Jurassic period to the present. The sediments along the existing coast of Louisiana, Mississippi, and Texas are estimated at from 20,000 to 30,000 feet thick (Eardly, 1962, p. 650). Variations from this character exist in northern Louisiana, where large domes and uplift areas create a significant change in the character of the Louisiana landscape.

In northwestern Louisiana a river may lie at the base of a 300-foot incline, which is a mountain by Louisiana standards. These hills are dominated by hardwood species, towering pines, and dense underbrush. Moving southward, the complexion of the landscape changes. The land gradually flattens and an abundance of freshwater marshes and channels crisscross the countryside. Here the only significant rises are natural ridges, or levees, along rivers and streams. In the southern region tupelo gum and cypress trees abound, creating a visual character significantly different from the northern Louisiana hill country.

The river current in the hill country varies little from other regions in the United States, yet it generally differs from that in southern Louisiana, where rivers seem to disobey hydrologic convention. Rivers, swamps, and channels appear to merge and crisscross the landscape. French colonists who explored this region reported mysterious bodies of water. This region of "sleeping or dead" water, exhibiting little discernible current, was identified as undesirable to explorers, since the vast maze of waterways could easily cause confusion and disorientation. Here the land is crisscrossed by a complex pattern of rivers, swamps, and bayous. The term *bayou* is defined by geographers as a watercourse that serves as a distributary or natural outlet of a river. Louisianians are less precise in their definition, applying the term to every form of watercourse, distributary or tributary, whether it begins or ends in a river, swamp, lake, or marsh (Fiebleman, 1973, pp. 20–21).

This analysis of the visual preference value associated with Louisiana rivers deals with a variety of waterway situations. The fine line between a river, a bayou, and in some cases a swamp is often difficult to distinguish. The scenes used here are primarily water corridors where a definable shoreline exists. The significant factor is that the geological and cultural history have a profound effect on the visual character and preference value attributed to the southern Louisiana river-swamp landscape. These influences create a landscape character that is unique and regionally based. It is this visual character that will be analyzed and described. Whether a waterway is described as a river, bayou, canal, or swamp is of little consequence.

This study pertains to the analysis of factors influencing visual preference of the southern Louisiana river landscape. A methodology is developed and tested analyzing factors relevant to visual preference. The logic used in the development of the evaluative system is based upon previous research in landscape assessment, environmental psychology, and landscape architecture.

Respondents

The sample consisted of 101 students in landscape architecture at Louisiana State University. The students were tested over a three-day period. Students in landscape architecture were chosen because it was felt that the group could be considered a uniform sample as well as a source readily available for testing. This choice was influenced by the fact that often an individual's state of mind concerning visual preference is related to career motivation rather than to other factors, such as age and sex (Dearinger et al., 1973, p. 11).

Stimuli

A questionnaire accompanied the respondent analysis of twenty Louisiana river landscape scenes. Some of the slides used in the evaluation were supplied by staff in the Department of Landscape Architecture at Louisiana State University. The remainder were supplied by the researcher. The 35-millimeter slides depicted a wide variety of characteristics of the river environment. All of the scenes were taken from a position on the waterway viewing toward the shoreline environment. The slides were based upon demonstrated variability in landform, waterform, and/or vegetative characteristics. This variability was sought in an attempt to analyze the validity of concepts identified in the visual preference model. This analysis was based upon respondent reaction to the visual stimuli (slides).

Procedure

Development of the model for visual preference: A theory proposed by Stephen and Rachel Kaplan provided a basis for the structuring of the preferential model. The theory attempted to explain the perceptual process in terms of informational processing, suggesting that examination of the information an environment provides can be used to isolate components relevant to individual preference.

Four factors are identified as being important

Table 4.1 The Evaluative Process

Major Topic	Major Variable	Vegetation	Land	Water	Total scene
	Level 1: Perceptual Influences				
Legibility	Definition	X	X	X	
	Edge contrast	X	X	X	
Complexity	Diversity	X	X	X	
	Edge complexity				X
Spatial definition	Enclosure				X
	Depth				X
Mystery	Mystery				X
	Level 2: Emotional Influences				
Distinctive elements	Visual distinction				X
	Natural shoreline distinction				X
Disturbance factors	Man-influenced shoreline distinction				X
	Visual pollution				X

to visual preference in the environment, two informational variables and two involvement variables. Legibility and spatial definition are important informational variables; complexity and mystery are the two involvement variables.

Legibility involves the clarity or coherence of a scene, aiding in individual recognition of visual elements. *Spatial definition* primarily involves the arrangement of three-dimensional space within the visual array. It affects orientation and has a definite influence on individual perception and preference.

Complexity involves the number and relative distribution of landscape elements. *Mystery* concerns the promise of additional information and encourages an individual to enter a visual display in order to seek this additional visual data. As the complexity of a scene increases, the amount of visual information available to the viewer also increases. The effect of mystery upon the amount of visual information available is similar. The difference between the two concepts is that complexity requires more time and analysis, whereas mystery promises additional information through a change in vantage point (S. Kaplan, 1975, p. 94).

Judith Levin (1977) attempted to test the validity of these concepts in application to analysis of riverscape preference. These four variables appeared to be of value in the prediction of preference for river landscapes.

In this study two important levels of evaluation are identified in the analysis of preference value for a scene. The first involves the identification of perceptual influences. The four variables serve as the general base for this level. The second involves the identification of emotional influences in the landscape, those that attract attention and can exist as positive or negative influences upon visual preference for river corridors. An analysis is conducted identifying distinctive or feature elements and disturbance factors appearing in the landscape. The next step was to relate these principles to the primary landscape components—land, water, and vegetation.

Table 4.2 A Sample Rating Sheet

Date ____________ Slide # ____________

River ____________ Evaluator ____________

Variable	Dimension	Rating Dimension	Rating Scale 1	2	3	4	5	Rating
Legibility	Definition	Vegetation						
		Water				X		4
		Landform	X					1
	Contrast	Vegetation					X	5
		Water		X				2
		Landform	X					1
Complexity	Diversity	Vegetation		X				2
		Water		X				2
		Landform		X				2
	Edge complexity	Skyline			X			3
		Shoreline			X			3
Spatial definition		Enclosure			X			3
		Depth					X	5
Mystery		Mystery		X				2
Distinctive elements		Distinction		X				2
		Natural			X			3
Disturbance factors	Shoreline Disturbance	Man (inf.)					X	5
		Pollution					X	5
		(1) Total Points						50
		(2) Total Possible Points						95
		Assessment Ratio						.588

Note: Total possible = number of factors rated X 5; Assessment ratio = (1) divided by (2).

The general evaluative process developed in this study is illustrated in Table 4.1. Each of the major topics discussed is further divided into a major variable or variables (not discussed in this section). The right-hand columns of the table gives the landscape dimension (landform, vegetation, water, or total scene) evaluated in the rating process: "X" indicates the landscape dimension rated under each of the variables. The evaluation of visual preference value of a scene may therefore involve the analysis of vegetation, land, water, or the total scene (composite visual factors) according to a specific rating-procedure variable. A total of seventeen factors are analyzed for each landscape scene.

A descriptive approach is used in the analysis of the criteria relating each evaluation to a descriptive rating scale. Preceding each rating scale is a brief review of the literature applicable to the rating topic to justify and clarify each procedure. The original study is written as a "cookbook" approach. It explains rating procedures and provides descriptive rating scales with the thought that by thoroughly studying the procedures and concepts, any interested individual could apply the proposed system of analysis.*

The rating scales were not created as a gauge to specific right or wrong answers, but to serve as a general indicator of preference. It was envi-

*A detailed discussion of all the rating criteria, processes, and weightings appears in Lee (1978).

sioned that the detail required by the 17 analyses would force rating dimensions to offset each other and allow combinations and the relationships between the dimensions to develop. Through this form of analysis the combinations of factors and these influences would dominate the model result rather than the influence of a single dimension. The determination of preference value in a scene requires a detailed analysis of the combination and relationships of preference factors. These combinations were hypothesized to be more significant in the prediction of preference than the analysis of a single dimension.

Through the analysis of factors relevant to visual preference, greater knowledge was gained in developing an understanding of the "substance of a view." After developing preference categories and applying these to the landscape components of land, vegetation, and water, an attempt was made at consolidating these separate analyses into a meaningful model for visual preference prediction. It was assumed that by analyzing these separate categories and combining them into a logical decision-making format, a tool would be produced that is significant in the prediction of visual preference for Louisiana river landscapes.

The importance of the study lies not in the specific rating criteria or the numerical scales used. The numerical values were mainly used for the comparison and testing of the concepts presented in the evaluative system. The importance of the study lies in the general approach and the concepts that served as a basis for the evaluation. Important also are the results and conclusions identified in the study of the Louisiana river landscapes. These general factors will involve most of the remaining discussion.

Testing the Evaluative Model: The evaluative model system was used in the analysis of twenty Louisiana river scenes. A form similar to that presented in Table 4.2 was used in the evaluation of the scenes. The table shows a sample rating. In the analysis seventeen factors were isolated as influencing preference in river landscapes. These factors or dimensions were then related to descriptive five-point scales in the analysis of the twenty scenes. These separate evaluations were then combined into a numerical average, termed an "assessment ratio." This ratio was hypothesized as indicating the relative visual preference value for the Louisiana river landscape scene. The slides were then ranked from 1 to 20 (1 indicating the highest preference value, 20 indicating the least preference value) according to the assessment ratios determined by the evaluative-model format.

The same slides were shown to the students in landscape architecture. The students were asked to rate the slides according to the following scale:

7. extremely beautiful (breathtaking)
6. very beautiful
5. moderately beautiful (slightly above average)
4. average scene
3. moderately unattractive (slightly below average)
2. very unattractive
1. extremely unattractive (eyesore)

The students were shown the slides before they indicated the preference value. This was done so that the respondents could view the relative visual character of the scenes before determining their preference. The slides were mixed and shown in random order, and the students were given thirty seconds to evaluate each one from 1 to 7.

The values for each slide were totaled, then ranked, similar to the procedure used in the model evaluation, from 1 to 20 according to the totals. The rankings for the two procedures were statistically compared to determine if a significant correlation existed between them.

Results

The results of the preference evaluations appear in Tables 4.3 and 4.4.

The ratings were analyzed and the scenes were ranked from 1 to 20. The analysis was conducted separately for both the model evaluation and the respondent evaluation. The rankings as indicated by both appear in Table 4.5.

The Kendall rank coefficient was used to analyze the degree of agreement between the two ranking procedures (Siegel, 1956, p. 213).

$$\tau = \frac{S}{\frac{1}{2}N(N-1)} = \frac{150}{\frac{1}{2}(20)(19)} = .7894$$

This value (.7894) represents the degree of correlation between the respondents' evalua-

Table 4.3 Ranking of the Scenes in the Respondent's Evaluation

Slide #	Total	Rank	Slide #	Total	Rank
1	451	14	11	420	15
2	576	3	12	410	13
3	405	16	13	500	9
4	498	11	14	499	10
5	476	12	15	318	18
6	590	2	16	611	1
7	510	7	17	323	17
8	296	19	18	543	5
9	509	8	19	523	6
10	561	4	20	169	20

Note: The higher the total, the higher the preference value of the scene.

Table 4.4 Ranking of the Scenes in the Model Evaluation

Slide #	Ratio value	Rank	Slide #	Ratio value	Rank
1	.505	12	11	.450	16
2	.644	3	12	.522	9
3	.477	17	13	.552	7
4	.517	10	14	.544	8
5	.488	14	15	.470	15
6	.655	2	16	.688	1
7	.578	5	17	.437	19
8	.444	18	18	.500	13
9	.511	11	19	.555	6
10	.635	4	20	.425	20

Note: The higher the ratio value, the higher the preference value of the scene.

Table 4.5 Comparison of the Model Evaluation and the Respondent Evaluation

	Ranking of the twenty slides																			
Pr. #1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pr. #2	1	2	3	4	7	6	9	10	13	11	8	14	5	12	18	15	16	19	17	20

Pr. #1 = Model ranking.
Pr. #2 = Respondents' ranking.

tion and the model evaluation. If the 101 students are considered to be a random sample from some population, the significance of the association between the model evaluation and the respondents' evaluation can be tested by using the following formula (ibid., p. 221).

$$Z = \frac{\tau}{\sqrt{\frac{2(2N+5)}{9N(N-1)}}} \quad \frac{.7894}{\sqrt{\frac{2\ (2)(20)+5}{9\ (20)(20)-1}}} \quad \frac{.7894}{\sqrt{\frac{90}{3420}}} = 4.866$$

$Z = 4.866$

If it is hypothesized that there is no significant correlation between the rankings, a Z value of 4.866 has the probability of occurrence of $p = .0000005896$. Thus the null hypothesis (Ho) can be rejected at a significant level of .0000005896. The alternative hypothesis (Ha), that there is a highly significant correlation between the model and the respondent evaluation, can be accepted. If the null hypothesis (Ho) is really true, the probability of drawing a random sample producing the same result is .0000005896.

Discussion of the Results

The statistical analysis indicates that a strong relationship exists between the model ranking and the respondent's analyses of the twenty Louisiana river scenes.

Legibility

The top three scenes chosen according to the model format and also by the respondents rated very high in terms of vegetation legibility. Each of the three scenes rated high in terms of vegetation legibility because of the clear presentation of individual plant forms and internal vegetative structure (limbs, trunks). Visual penetration (ability to see into the shoreline environment) and physical access (ability to enter the shoreline environment) was not obstructed by tangled masses of vegetation. This concept is demonstrated to a degree in Figure 4.2 (ranked third in the model and respondent evaluation). The forms of the individual cypress trees are not totally obstructed; connections and limb structure are readily apparent. Also, the penetration of view further into the shoreline environment is not totally obstructed by dense vegetation.

The presence of a strong vegetation edge, particularly in conjunction with water, appears to be a characteristic related to visual preference in the Louisiana river landscape. All of the preferred scenes and the scenes in the middle ranks possessed dominant vegetation in conjunction with the water surface (this factor is also related to enclosure). Figure 4.3, ranked thirteenth by the model evaluation and fifth by the respondents, shows a channelized waterway. The model-based analysis ranked the scene thirteenth primarily because of the shoreline disturbance and the lack of shoreline complexity. The respondents did not seem to react as strongly to the channelization as the model evaluation predicted. The dominant edge contrast produced by the trees in conjunction with the water appear to subordinate the influence resulting from channelization of the waterway. It appears that despite the obvious human influence the landform vegetation and water characteristics seemed to negate the human impacts upon the visual preference value of the river scene.

Complexity

The complexity of the water surface appears to have an influence on visual preference for the Louisiana river environment. Both scenes (Figures 4.4 and 4.5) demonstrate similar vegetation characteristics. Tangled vegetation dominates the middle-ground zone. This can be described as an illegible situation in terms of vegetation. Individual plant forms cannot be distinguished, and the mass of vegetation limits the view of the shoreline from the river. Physical as well as visual access to the shoreline environment is destroyed by vegetation. The primary difference in the scenes is the complexity of the water surface. Water appears to become a more distinct element as the complexity of the water surface increases, producing heightened visual interest. Figure 4.4, a low-ranking scene in terms of vegetation and landform characteristics, gains visual distinction because of the diversity of the water surface. Figure 4.5 displays a less complex scene relating to the water surface than does Figure 4.4 while depicting similar landform and vegetation characteristics. This concept is supported by the higher rating given to Figure 4.4 than to Figure 4.5 by both the model-based evaluation and the respondent evaluation.

The complexity of the skyline and shoreline

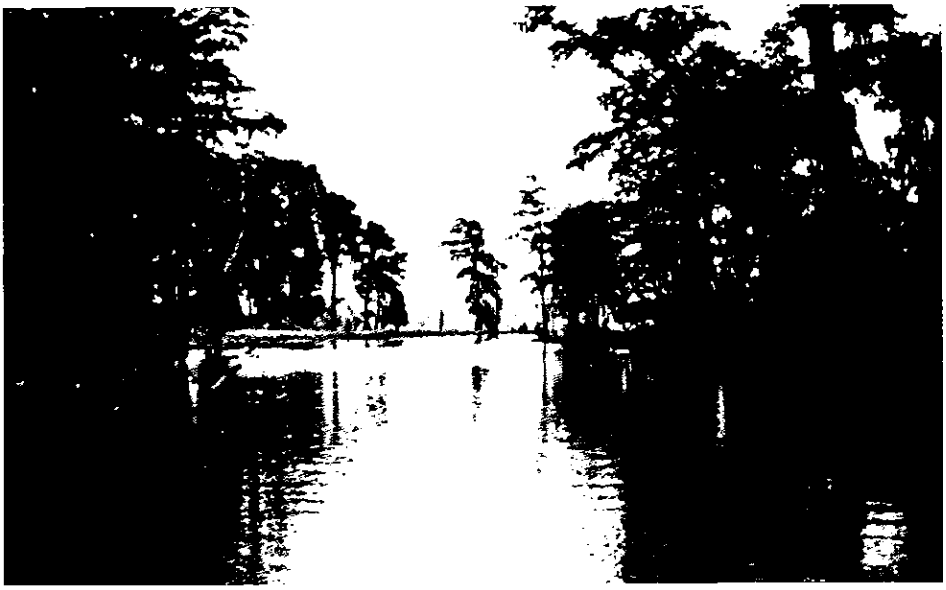

Figure 4.2. Legible vegetation.

Figure 4.3. A strong edge created through the contrast of dominant vegetation and water.

Figure 4.4. Highly complex in terms of water-surface variation.

Figure 4.5. Less complexity relating to the water surface than in Figure 4.4.

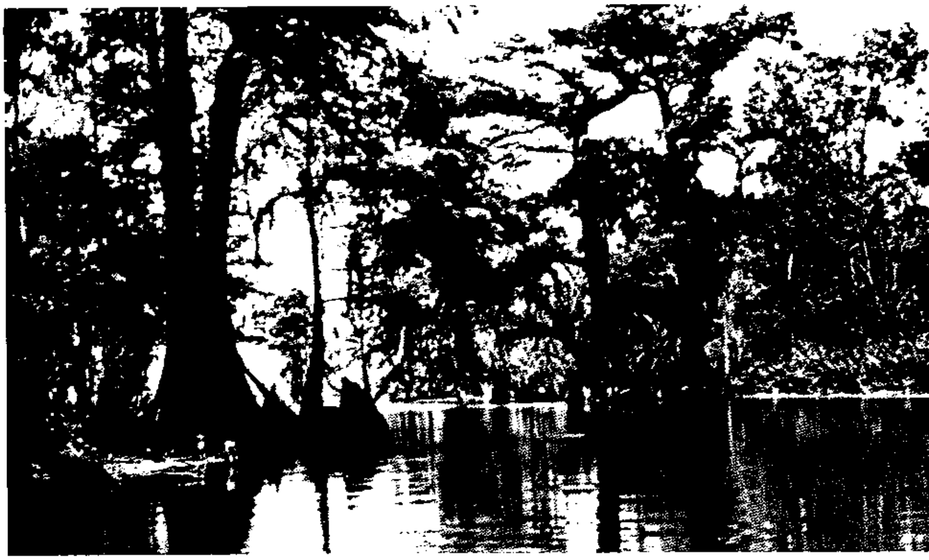

Figure 4.6. Skyline and shoreline complexity.

was evaluated for each of the twenty scenes. These analyses were made on the assumption that the more irregular the skyline and shoreline edges, the greater the visual interest in the scene. The three highest ranking scenes according to both the model evaluation and the respondent evaluation possessed irregular skyline edges. Figure 4.6 was rated first by both the model and the respondent evaluations, and it was also rated high in terms of skyline complexity. (Skyline complexity refers to an analysis of the irregularity of the junction between the land and/or vegetation and the sky.)

This relationship is strongly dependent upon vegetation in Louisiana. The skyline complexity in Figure 4.6 is influenced by the irregularity of the cypress trees and the height variation existing between the individual trees. This irregularity produced by form and height variation creates an irregular interface between the vegetation and the sky and thus produces a complex skyline edge.

Figure 4.6 also demonstrates a degree of shoreline complexity. (Shoreline complexity refers to an analysis of the irregularity of the junction between the land and/or vegetation and the water.) The structure of the shoreline is strongly related to the geological action upon the material that composes the river or stream basin. Generally, the more irregular or complex shorelines form in regions where bedrock or glacial deposits occur as the river cuts its course through the landscape. In Louisiana rock outcroppings are rare, and ancient alluvium serves as the primary material of the river basins. In most cases Louisiana rivers appear to follow a meandering course.

Figure 4.6 is an exception. The irregularity of the shoreline is created not by rock formations, but by the large cypress trees extending out into the water surface. Vegetation is legible because individual plant forms and limb structure are visible.

Spatial Configuration

All of the highly rated scenes have significant enclosing or space-defining elements (primarily trees). A lack of these elements appears to have a detrimental influence on individual preference. Figure 4.7, ranked poorly by both the model evaluation and the respondents, lacks enclosure and significant space-defining elements and thus is monotonous. It appears that individuals respond to space-defining elements. Such elements are important for orientation and the identification of significant scale relationships. A lack of such space-defining or modulating elements produces a negative effect upon visual preference.

Figure 4.7. Few space-defining elements.

Mystery or Anticipation

Figure 4.8 demonstrates the mystery dimension. Here overhanging vegetation obscures but does not totally obstruct the view. The river course moves out of sight, creating anticipation. Despite this feeling of mystery, the legibility or clarity of the visual information is reduced. This indicates the interdependence existing between all of the preference variables used in the evaluation.

The discussion indicates that for a scene to be of superior visual quality it must maintain a mix or balance of dimensions. One dimension (in this case, mystery) cannot dominate the other dimensions. The highest ranking scene (see Figure 4.6) possesses a good mix of the vital dimensions (legibility, spatial definition, mystery, complexity). Figure 4.8 illustrates dominant mystery and spatial enclosure, but legibility and complexity were rated lower.

Disturbance Factors

Shoreline disturbance may have a negative influence on visual preference of the Louisiana river environment, but further testing is necessary to determine to what degree. Figure 4.9 features an eroding shoreline. The disturbance, probably caused by fluctuation in the water level during periods of flooding, has initiated erosion and destroyed the shoreline character, as well as native vegetation. This disturbance was followed by the encroachment of weedy vegetation, which obscures the individual plant forms, producing an illegible situation. The cut bank also isolates the dominant native vegetation from the water surface, which limits potential contrast. Landform serves as the primary contrasting element relating to the flat water surface, yet despite this distinction, the erosion and the starkness produced by the barren soil surface may have further contributed to the negative visual reaction.

Figure 4.10, ranked poorly in the model evaluation and by the respondents, contains little complexity, enclosure, mystery, or distinction, yet it is quite legible. It is difficult to determine what primary factors produced the negative visual response.

In the channelized waterway scene (see Figure 4.3) negative impacts from channelization were subordinated by positive landscape characteristics (vegetation edge contrast, enclosure). Figure 4.10 exhibits little in terms of visual preference value because of the lack of contrast, complexity, spatial interest, and mystery or anticipation. It is difficult to determine whether the respondents reacted directly to the evidence of human presence or indirectly to the

Figure 4.8. Mystery resulting in heightened visual interest.

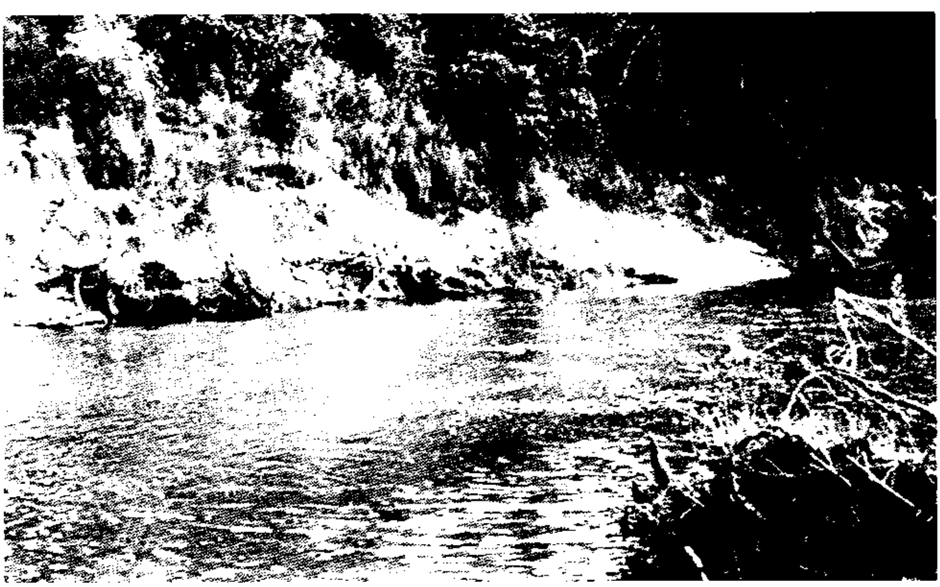

Figure 4.9. A shoreline disturbance caused by high water.

Figure 4.10. A shoreline disturbance initiated by human activity.

effects of this influence on natural shoreline character and the landscape characteristics.

Figures 4.9 and 4.10 could have produced a negative reaction because of photographic quality. Both scenes are somewhat overexposed and appear to be barren and devoid of color. Obviously in most cases this overexposure will produce a negative visual reaction. Despite the variation in the photographic quality of the two scenes, both rated the landscape characteristics poorly. It is interesting that despite the overexposure, the respondents placed no emphasis on photographic quality and a heavy emphasis on the landscape components. It is therefore not possible to determine the extent to which the photographic quality influenced the respondents' reactions versus their reaction to the landscape characteristics.

Implications

General Landscape Character

The geologic character of the southern Louisiana landscape has a profound influence in the creation of a region exhibiting unique visual character. This geologic structure has contributed to a region where the land appears to merge with water as numerous waterways crisscross the landscape. Rapid flowing water in a Louisiana river is a unique occurrence and because of this scarcity seems to gain visual significance. Water in the Louisiana landscape is often muddy and nonreflective, since it is naturally high in sediments.

In southern Louisiana the river shoreline environment lacks the visual complexity found in other regions. Here intrusions and massive rock formations are rare. The ancient sediments that form the foundation of the Louisiana basin offer little resistance to the slowly moving waters. The characteristic meandering shorelines contrast significantly with the complex, irregular shorelines found in other regions in the United States.

This lack of shoreline and waterform complexity (lack of swift water and complex water-surface patterns) in southern Louisiana is a highly significant visual occurrence. But while it is significant in Louisiana, it would be of little visual significance in other landscape types.

The envelope of land that surrounds a waterway gains visual distinction as elevation change increases. Water as a characteristically flat surface gains visual significance as surrounding landforms become irregular and slopes steepen. The steeper the slope, the more opportunities there are for viewing the land and its surface features. In regions such as southern Louisiana observation comes primarily through level lines of sight, and much of the scene is hidden by obstructing objects. Topographic variability is important in increasing visual landform distinction, but vegetation obstructing or obscuring the view decreases it. Isolation of the landform through visual obstruction destroys the potential for visual interest existing in the characteristic relationship between landform and water (Litton et al., 1974, p. 69).

The lack of topographic change in Louisiana decreases the significance of landform and increases the impact of vegetation upon visual preference. In this region vegetation provides much of the visual stimulus that in areas of dominant topographic change are more dynamically provided by landform.

This visual preference for the Louisiana river landscape appears to be highly dependent upon the legibility, contrast, and complexity of vegetation. In regions of low relief vegetation becomes the primary formative element in visual display. In regions of significant topographic change the landform legibility, contrast, and complexity dimensions would gain importance relating to individual preference for the river environment, while the importance of vegetation would be diminished.

The River-Shoreline Relationship

The influence of topography on visual preference is regional in nature. What is significant in a flat landscape may be incidental in mountainous terrain. Because of the scarcity of significant topographic change in Louisiana, enclosure is less dependent upon landform impact than it is on ground pattern created by vegetation. It is vegetation, not landform, that modulates space and provides significant scale orientation.

For a river user space and scale relationships provided by shoreline vegetation must be clearly definable from the viewer's position on the river. Openness or a large expanse of water with little vegetation may provide a momentary change in viewing sequence, but continuous exposure to this situation will become monotonous and disorient the observer.

The visual connection between the river and the shoreline is extremely important (Figure 4.11). The water provides excitement and change, while in Louisiana the shoreline vegetation provides important scale and spatial clues. In an expanse of water a viewer cannot receive this information from the shoreline environment. Any factor that would separate or block this important visual connection may produce a negative influence on visual preference for river corridors. Preference is not necessarily related to the degree of enclosure in a scene. What is important is the presence or absence of scale and space-modulating elements and the important visual connection between the water and shoreline environments (Figure 4.12).

Legibility of Vegetation

The clarity or legibility of vegetation and the edge relationships it provides are extremely important to visual preference. In the Louisiana river landscape an individual must be able to see connections and the structure of vegetation. Preference studies indicate that individuals dislike "unkempt vegetation" (Levin, 1977, p. 35; R. Kaplan, 1976, p. 246; 1977, p. 287). This implies that the vegetation component is not legible, connections cannot be seen between parts, and forms are obscured as uncontrolled vegetation causes plant forms to merge and conflict (Figure 4.13). Tree trunks are hidden among a mass of vegetation and destroy the important visual connection between the vegetation and the land.

Preference studies show that legible vegetation need not exist totally without human intervention. Rabanowitz and Coughlin determined that people generally prefer landscapes that tend to be "parklike" in appearance; "mowed grass and scattered large shade trees seem to be determining factors" (Rabanowitz and Coughlin, 1970, p. 7). Analysis shows that people relate visual preference to anticipated use of an environment.

Visual as well as physical access is related to the visual preference of a river scene, particularly for a recreationist. For example, a climax forest with tall mature trees and little understory entices visual and physical exploration because it is accessible. Dense understory vegetation blocks the view from the river into the forest. In addition, if a river user wanted to leave the river to move into the shore environment, dense vegetation or a sharp stream embankment

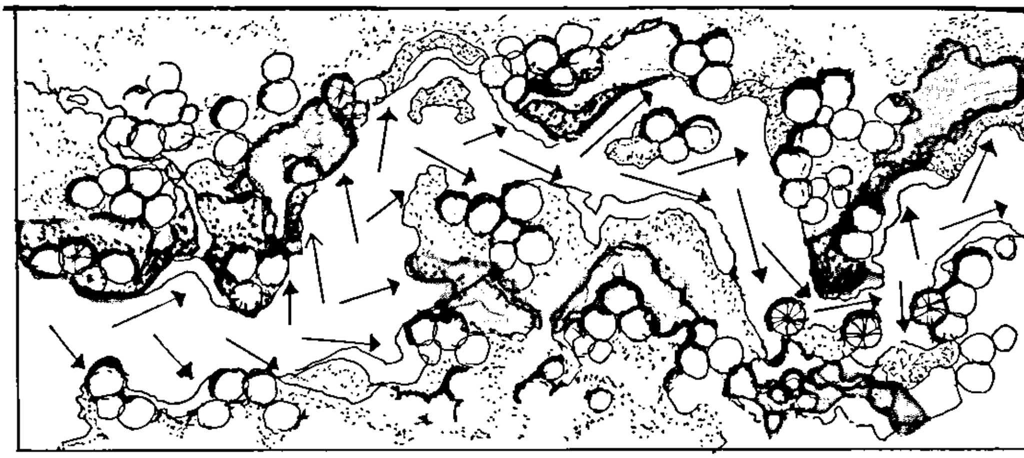

Figure 4.11. A river traveler constantly receives important visual and spatial cues from the shoreline environment.

would impede his entrance. A similar concept is indicated by Newby:

> An environment must be accessible not only in physical terms, but also in psychological and visual terms; it must not deny but rather encourage participation, involvement and choice. Without such attributes, an environmental display becomes nothing more than reflection of everyday life, space with its monotonous and non-motivating character. This is a situation to be avoided. (Newby, 1971, p. 69)

Vegetation can partially obscure a view to the surrounding river environment. It may also indirectly create a sense of anticipation by limiting and modifying the amount of light entering a visual display. Alteration of light intensity can obscure vision by producing darkness or by modifying light patterns.

Legibility versus Complexity

The legibility of vegetation is important to visual preference in the Louisiana river landscape. Preference testing indicates that legibility was important, but an important relationship exists between legibility and complexity.

Wohlwill (1966, pp. 29–38) describes the legibility of the outdoor environment in terms of an individual's ability to adapt or understand a visual experience. Each individual has an adaptation level to environmental stimuli that is based upon the environment he or she experiences daily. Individuals derive pleasure in variations from this typical visual display or setting.

The horizontal scale in Figure 4.14 measures the amount of stimulation; the vertical scale illustrates the effect. Any variation from the adaption level produced by either an increase in stimulation (a more complex environment) or a decrease in stimulation (a less complex environment) produces an initial positive reaction. Any increase in the amount of stimulation produces excess information, which inhibits an individual's ability to process or perceive information, and the scene is no longer legible. This in creased complexity in the environment produces a negative impact upon a perceptual experience; thus the environment becomes chaotic. While legibility encourages perceptual lingering, visual chaos produces stress and alienation (Newby, 1971, p. 70). A decrease in the amount of stimulation will also evoke a positive response, because of the increased legibility and simplicity in the environment. However, a point is reached where the decrease in stimulation results in monotony, producing a negative perceptual reaction.

This indicates that for a scene to evoke a positive visual response, it must be more than merely legible. A legible scene, clearly exhibiting strong identifiable relationships among parts, may also be monotonous. A degree of

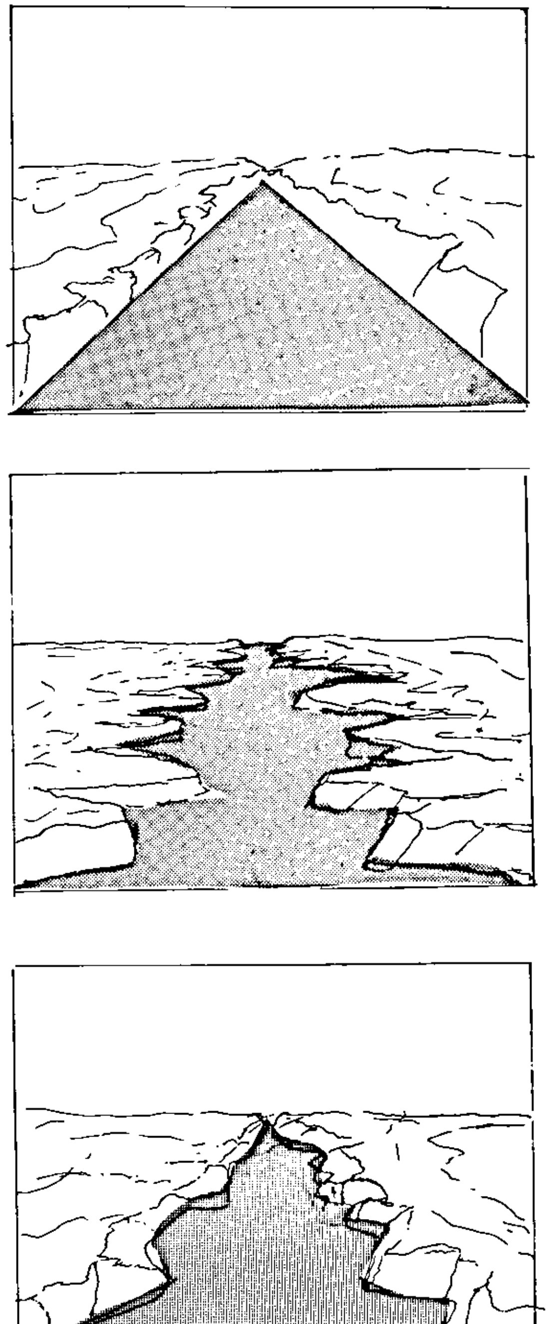

Figure 4.12. The more complex or irregular the shoreline, the greater the visual interest.

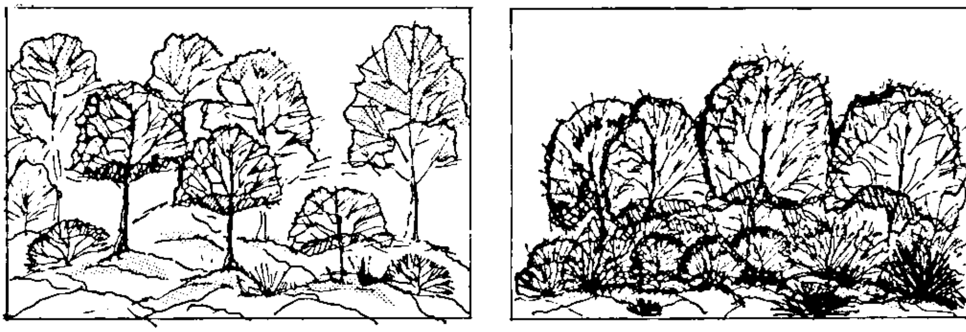

Figure 4.13. Legible versus illegible vegetation.

complexity or interest must exist for a visual display to evoke a positive viewer response. Visual complexity has a positive effect upon visual preference until the scene is no longer legible. At this point the visual display becomes chaotic, indicating a negative response.

Thus there is an optimal or ideal level of stimulus or complexity that each individual is capable of translating to meaningful information. Even though an optimal level of complexity exists, measuring this level is a more difficult problem.

Summary

In this study the general concepts proposed in the informational theory were expanded, applying them to the landscape components of land, vegetation, and water and attempting to create a model that could predict human preference for Louisiana river landscapes. The importance of the interdependence between the evaluative factors become readily apparent. The strong interdependence indicates that a scene will not possess exceptional preference value with one or two of the characteristics (legibility, complexity, spatial definition, mystery, distinction, or disturbance) dominating. A high-ranking scene in visual preference, in most instances, will possess qualities relating to each factor. Thus the mixing and combination of factors and the resultant effect upon visual preference appears to be more significant than the effect of a single factor. To what extent each factor influences preference could not be concluded in this study. This concept indicates potential areas for future research.

Utilization of the Study

The study is founded upon the assumption that a visual experience on a river consists of a series of views or sequential glimpses down a river corridor. If a system were developed to evaluate the visual preference for these views, a significant tool will be available for the evaluation and subsequent land-use planning in river corridors or any water-related landscape. The model could be used as the basis for establishing an inventory system for the analysis of rivers in Louisiana. Coupled with a photographic inventory, the model could be used that eventually would result in the establishment of a hierarchy of rivers or river sections based upon predicted preferential value.

A numerical value, or "assessment ratio," has been determined for each of the photographs or slides. A photographic inventory could be conducted on all rivers or river sections in a scenic river system. By evaluating each photograph numerically according to the seventeen rating criteria and by totaling these values, a hierarchy could be established based solely upon visual preference. Rivers or river stretches rating the highest might be preserved, while other use designations would be given according to the numerical results of the evaluation.

At a site scale of evaluation, the model could be used to identify key river stretches and distinctive river sections. Zones could be located relating to a hierarchy of uses based upon visual preferences. For example, a recreational activity may be located in a zone of low visual quality, while viewing or observation

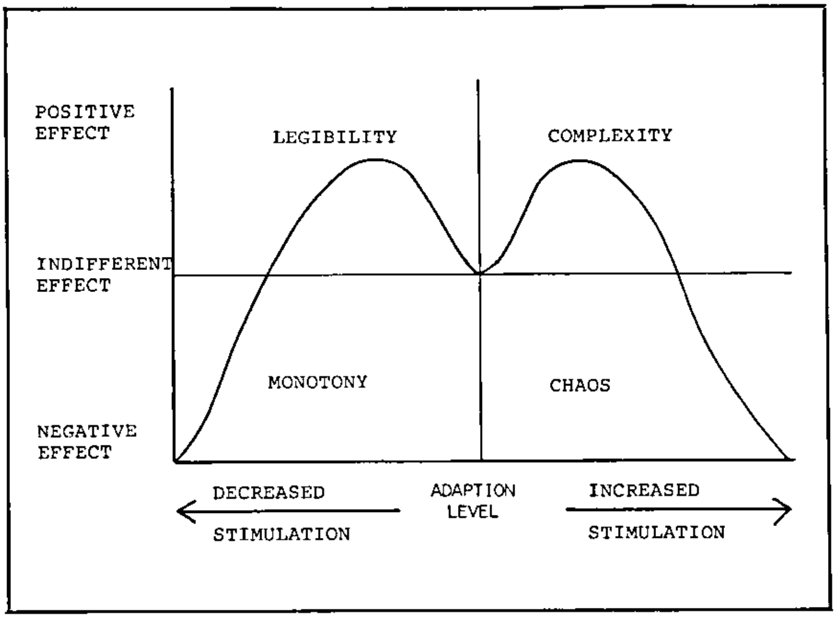

Figure 4.14. Discrepancy from adaptation level (adapted from Wohlwill, 1966, p. 35).

points may be established in key visual zones that have been set aside for protection. The detail of the photographic inventory indicates the detail of the analysis.

The model could also be used to locate key areas for recreation sites, bridges, or power-line crossings. An evaluation could be made on the impacts of proposed or existing activities on visual quality. A more detailed analysis of the inventory data would yield information on individual rating factors, such as complexity, spatial enclosure, legibility, and shoreline disturbance.

Future Research

The need for extensive testing of the concepts discussed in this study should be stressed. Testing should be done, analyzing further each rating dimension used in the model evaluation. Each dimension should be tested examining the influence of the dimension upon visual preference. Once the significance of each rating dimension has been evaluated, the relationships among the dimensions should also be examined. Statistical tests should be run on the relative significance and behavior of each dimension as well as the relationship between dimensions. Limitations in the scope of this study did not allow for extensive statistical analysis of the evaluative model. The preliminary indications are that the model has value in the assessment of visual preference for Louisiana river landscapes, but the use of the system for practical purposes should not be conducted until the model has been adequately tested and revised for utility, clarity, and accuracy.

Additional analysis should be conducted testing the concepts proposed to determine the correlation between landscape preference and visual-quality evaluation in the landscape. Such an analysis is needed in the development of visual assessment systems. Such systems would be of significant value in the land-use decision-making process.

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