

Perceived land use patterns and landscape values

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Abstract

Land use patterns and land form are important sources of information that contribute to the formation of landscape perceptions and values. This paper discusses three concepts of human-landscape relationships: the human as an agent of biological and physical impacts on the landscape; the human as a static receiver and processor of information from the landscape; and the human as an active participant in the landscape – thinking, feeling and acting – a transactional concept. A model of the transactional concept and of human perception and response is presented along with a conjectural example of human-landscape transactions. Three empirical research projects are presented to illustrate varying relationships between and among humans and landscapes. Variations in human experiences, needs and desires, personal utility functions for the use of the landscape, and socio-cultural contexts are suggested as mediating variables on perceived values and human responses. The importance of landscape values information to planning and management activities is discussed.

Introduction

Land use patterns can be interpreted and analyzed from many perspectives. For example, they can, to a greater or lesser degree, provide information about landscape function, economic opportunity, and environmental amenities. Each perspective normally represents a different value orientation. The focus of this paper is on the relationships between land use patterns and landscape values and how they relate to public perceptions and landscape planning and management decision-making.

Landscape planning has been defined as ‘that continuing process which helps to make the best use

for mankind of the limited area of the earth’s surface while at the same time conserving its beauty and fertility’ (Crowe 1969). Thus, landscape planning should play an important role in the shaping of landscape patterns. Clearly, the concepts of structure, function and change from landscape ecology (Forman and Godron 1986, Naveh 1986) are of central importance to the activity of landscape planning. And, an important link between these two areas of interest is understanding the relationships between humans and landscapes – understanding the meanings that individuals and groups attribute to and the values they hold for landscapes.

Objectives

My objectives in this paper are to: (1) briefly review several ways in which the relationships between humans and landscapes have been conceptualized; (2) present a conjectural example of varying landscape relationships based on different perceived values; (3) present examples of empirical research that attempt to identify landscape values; and (4) suggest the use of landscape values information as an important element in landscape planning and management decision-making.

Conceptualizing the human-landscape relationship

Among the many possible conceptualizations of human-landscape relationships, the most common is probably that of the human as a generator of impacts (Blissett 1975, Van der Zee 1982). The human is characterized as an agent of change in the physical and biological characteristics of the landscape. These human-induced changes vary in scale, intensity and type. They include soil erosion, air and water pollution, landscape conversions from natural states to suburbs and open-pit mines, and from abandoned farm lands to parks and productive forests. A dominant force in the evolution of this conceptualization was the enactment of the National Environmental Policy Act in 1969 and the ensuing requirements for environmental impact assessments. Within this conceptualization the human is rarely considered as a thinking and feeling organism. Furthermore, the major emphasis has been on the identification and mitigation of negative impacts. It has tended to ignore the positive aspects of human interactions with the landscape.

A second conceptualization of the human-landscape relationship is that of the human as a receiver and processor of information from the landscape. This concept draws upon ideas developed in the perceptual and cognitive branches of psychology. It is most prominent in the substantial body of research that has been developed in the field of landscape perception and, in particular, in the area of perception of scenic beauty or aesthetics (Zube *et al.* 1982, Daniel and Vining 1983). The human is

viewed as a static observer who thinks about or responds emotionally to the landscape. Findings from this research have shown, with a few exceptions (Zube *et al.* 1983), there is considerable agreement about scenic landscapes among those studied. Notable among white, middle-class, teenaged to middle-aged adult Americans are strong preferences for green landscapes with pronounced topography, diversity of surface pattern, water features, and little or no sign of human occupation. However, this emphasis has resulted in the neglect of other values. What is not known is how important scenic beauty is when compared with other landscape values.

A third conceptualization of the relationship is that of a continuing transactional process – of the human as a participant in the landscape. Important to this concept, which is drawn from the field of environmental psychology (Ittelson 1973), is the notion that the relationship is a complex one and that both the human and the landscape change as a function of the transactions. In a manner of speaking, there are reciprocal impacts. Some changes may be so small as to be imperceptible, while others may be blatantly obvious. The imperceptible changes in either the human or the landscape may, however, be cumulative and become perceptible only after numerous repetitions of the transaction. Changes in the landscape may be via conscious human interventions such as building a trail in a forest, or they may be unconscious such as the induced erosion of the trail by ever increasing numbers of hikers. At some point in time the repeat hiker will probably become aware of the ever deepening trough that is the trail and find that his or her perception of the trail has changed and that the trail no longer provides a satisfactory experience. This same phenomenon occurs in the impact concept, except that the changes in the human are rarely, if ever, considered.

The obvious and significant difference among these various conceptualizations of the human-landscape relationship is the implicit concept of the human. In the impact concept the human is viewed as an agent of physical and biological change in the landscape. In the second concept the human is viewed as a static receiver of information which in-

fluences his or her thoughts and feelings about, and responses to, the landscape. In the transactional concept, however, there is an active interchange in which the human not only receives information from observation but also from participation. It involves thoughts, feelings and behaviors and, it involves changes in the human and the landscape.

The underlying principles of the transactional perspective are that landscapes are not paintings or photographs to be viewed from some fixed position, but rather they are environments that surround and invite participation and exploration, they provide information from all directions via multi-sensory modalities – more information than can possibly be used – and, they have an ambience that reflects aesthetic qualities, the social context of the experience and the systemic qualities that help to characterize particular landscapes (Ittelson 1973). This conceptualization recognizes a full range of landscape experiences that can lead to the attribution of meaning and to the valuing of specific landscapes.

Landscape values

What do we mean when we talk about landscape values? The economists Sinden and Worell offer a useful definition in their discussion of ‘unpriced values’. Their definition goes beyond the traditional one of ‘relative worth’ which is frequently translated into economic terms. They suggest that value is a property of things and that receiving the thing that is valued should make a difference in one's life (1979: 4). The greater the desire or need for the thing, the greater the value to the individual.

This issue of needs and desire is important in the discussion of landscape values. While a farmer, a hunter, and a schoolboy may all agree on the scenic quality of a freshwater pond surrounded by a savannah-like woodland with fields of grain covering gently rolling hills in the background, they may value it differently. Each brings to it a different set of past experiences and of needs and expectations for the future. To the farmer who lives on the land it is a stock pond and grazing area for his cattle and may occasionally serve as an emergency source of

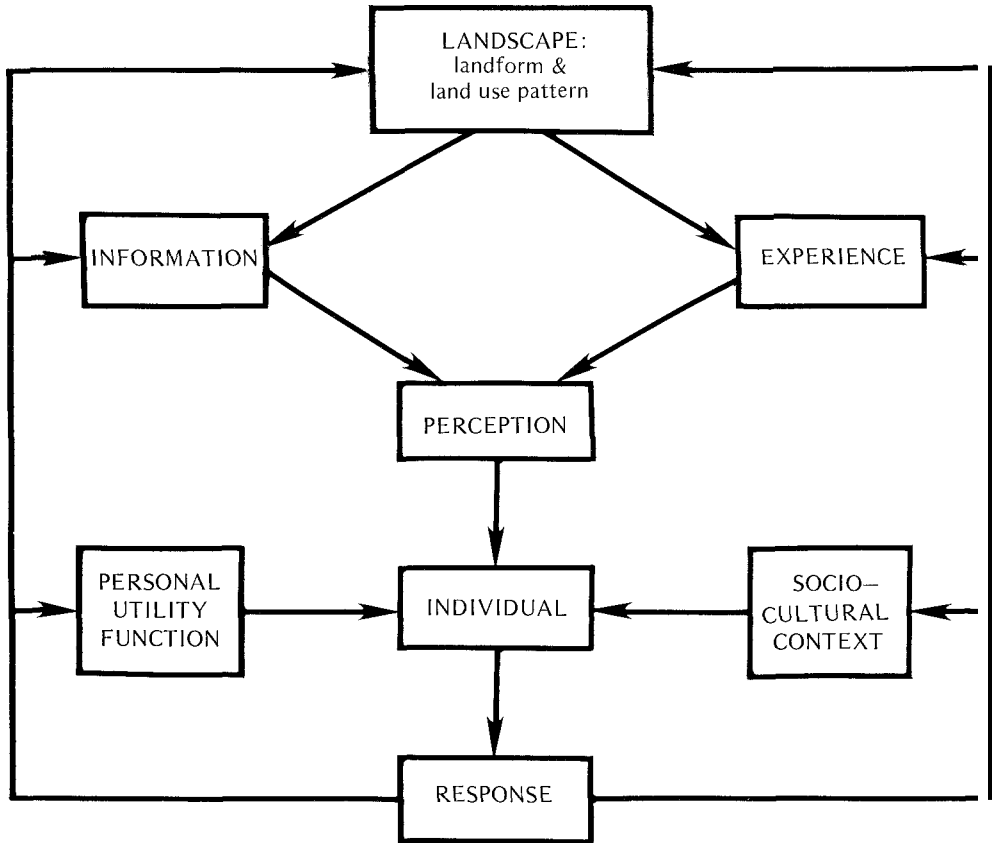
irrigation water during periods of inadequate rainfall. To the hunter from Center City, some 20 miles distant, it is a favorite spot for goose and duck hunting in the fall of the year. And to the schoolboy from the small town two miles down the road, it is the only place within five miles where he and his friends can engage in their favorite winter time sport, ice skating. The farmer, the hunter and the schoolboy all can agree on its beauty, but each also values it for a different purpose, each has a different need or desire to use it. And thereby, they attach different personal meanings and derive different values from the pond and its surroundings.

The landscape can be valued differently, partly because it provides a great deal of information, only some of which is received by any one individual. For some the value is related to present opportunities, and for others value may be associated with future opportunities. The way we see and value landscapes is in large part a function of what we do in them (Ittelson 1973).

The individual is sensitive to those bits of information which are related to his or her needs or desires and which invite the individual to become an active participant in the landscape. Values are clearly tied to the individual's personal experiences and purposes. For example, they are probably more strongly held by an active participant such as a farmer, than by a pleasure driver looking at scenery – an individual driving through rural landscapes, where the landscape is experienced through the windshield of a car, where the driver has no previous personal experience, and where the driver is only interested in passive viewing of the landscape.

Landscape perception

As indicated in Fig. 1, landscape perceptions are a product of the transactions between individuals and landscapes. Land form and land use patterns are important sources of information in this process. The distribution of fields, woodlots, hedgerows, water features and buildings and changes in these distributional patterns are perceived differently over time by different individuals. Together with the individuals' range of experiences they shape in-



(Based on Zube and Sell 1986)

Fig. 1. A transactional model of human/landscape relationships

dividual perceptions. And perceptions – mediated by the socio-cultural context in which the person exists and his or her personal utility functions – influence responses to the landscape.

The farmer, hunter and schoolboy each have different experiences in the pond landscape. While the farmer may have ice-skated there as a boy, and may also still hunt there in the fall of the year, as suggested in Fig. 1, other factors enter into his value orientation. His preferred utility function for that landscape is as a working component of an agricultural enterprise. The cultural environment in which he exists is one that is built around agricultural systems of production and marketing. His social environment is one of a shared lifestyle with other farmers and rural neighbors in the child rearing stage of life. All of these factors serve to reinforce his value structure.

Both the social and cultural context change over time as the farmer nears retirement and begins to perceive a new function for the pond landscape. Other values begin to take on more importance than stock watering or irrigation, and the attractive landscape is perceived as having value as a source of retirement income through the sale of house lots.

There is a series of transactions between the farmer and the pond landscape and a changing set of needs and desires that change his perceptions of the landscape and the value he attaches to it. His personal utility function changes as his needs and desires change, and this can be reinforced by the changing social and cultural context. He probably recognizes the range of values associated with that landscape, but the weights he places on the various values change.

The schoolboy is now an adult with a family and

looks forward to building a house on the shore of the pond that is a source of fond childhood memories. During the preceding years, the landscape pattern has gradually changed as the suburban like edges of the small town spread outward. The landscape is in a period of transition.

The city-dwelling hunter, on the other hand, joins with a local conservation group and tries to have the area protected as a significant natural feature so that his hunting desires can continue to be satisfied. The pond landscape with its surrounding savannah like woodland is one of the last remaining large undivided tracts of open land on this side of the city.

Understanding landscape values

Understanding landscape values has been a primary target of a series of studies undertaken in the state of Arizona. This can be a difficult and evasive target to hit. However several strategies have been employed in an effort to enhance probabilities of eliciting responses related to individual needs and desires and, therefore, to test some of the relationships illustrated in Fig. 1. These strategies include: (1) assessing attitudes towards the allocation of public funds for landscape management; (2) assessing attitudes towards planning; (3) identifying preferred land uses within the general area of the respondents place of residence or adjacent to a specific landscape; (4) selecting words and phrases used to describe landscapes; and (5) assessing perceptions of change in the landscape. Parts of three projects are presented. They span a time period of approximately eight years and vary in geographic extent from statewide to large scale site developments. Each explores landscape experiences and transactions in different ways, but all address questions of landscape values, perceptions of change, and attitudes towards planning.

The first study, a statewide geographically stratified probability survey of 1,500 residents, assessed landscape perceptions, outdoor activities, and attitudes towards various land use activities and planning (Zube *et al.* 1984). A 65% response rate was obtained from the 1303 deliverable questionnaires.

Prior to undertaking the mail survey 87 open-

ended interviews were conducted with representatives of diverse interest groups including recreation, urban planning, seasonal visitors, environmentalists, real estate agents, farmers and ranchers, politicians and professional natural resource managers (Zube and Law 1981). In addition, interviewees were selected from large and medium sized cities and from rural areas throughout the state. These interviews explored questions of landscapes that were of particular value, why they were valued, how they were described, the kinds of activities the interviewee engaged in there, and with whom. The interviews provided the raw materials for the design of the mail survey instrument.

The findings from the mail survey presented here are limited to those on attitudes towards different land use activities. The issue of landscape values was addressed first by requesting respondents to identify from a list of 13 landscape resource categories what they believed to be the highest priority categories for the allocation of limited public resource management funds (Table 1). Presumably people will allocate public funds to manage those public landscape resources that they value most. When these data were analyzed on a geographical basis, identifying regions that were dependent upon various landscape resources for economic livelihood, priorities changed. Residents of agricultural areas ranked wilderness and scenic resources among the lowest priorities and those from mining areas ranked agricultural lands and fisheries among the lowest. Most notable, and not surprising, all of the areas related to one of the three primary commodity resource activities – agriculture, forestry and mining – rated that resource highest for investment of public management funds.

Table 1. Arizona survey: Statewide sample resource priorities for management funds

High	Median	Low
Wildlife	Natural areas	Archaeological sites
Energy resources	Wilderness	Rangeland
Recreation areas	Fisheries	Mineral resources
Agricultural lands	Scenic resources	Timber resources
	Historic sites	

Table 2. Arizona survey: Statewide sample preferred land uses

Most	Median	Least
Wildlife habitat	Ranching	Mining
Recreation	Forestry	Second home areas
Farming	Wilderness	Subdivisions
Soil and water conservation	Historic and archaeological preservation	Commercial uses

The second approach to eliciting landscape values was to request respondents to identify from a list of 12 land use categories, those that they would most prefer to occur around where they live – within a radius of twenty miles (Table 2). Again, and in contrast with the statewide response, residents of areas where agricultural, forestry and mining were primary economic activities rated their respective activity as the most preferred. Similar to the farmer in the preceding hypothetical example, their primary landscape values are strongly influenced by personal utility functions and, quite likely, with established life styles in socially and culturally supportive environments.

The second study encompassed a portion of the watershed of one of the few remaining perennial streams in southeastern Arizona. The San Pedro River which lies within the transition area between the Sonoran and Chihuahuan Deserts, has its headwaters in Mexico and flows north to its confluence with the Gila River. The study area encompassed the riparian zone and adjacent uplands of an area extending from the Mexican border north for a distance of approximately 80 kilometers. This riparian zone is endowed with an exceptionally rich flora and fauna (U.S.D.I. Fish and Wildlife Service, 1978). Approximately 17,800 hectares of this area have been acquired by the U.S. Bureau of Land Management. Legislation is currently pending in the U.S. Congress to have this area declared a National Riparian Conservation Area.

Immediately prior to the public announcement of federal acquisition of this land, a mail survey of special interest groups and a random sample of the general public was completed (N = 539). The survey addressed a broad range of topics, including landscape description, awareness of change, preferred land uses, and attitudes towards planning

and management. Special interest groups included: farmers and ranchers, real estate agents, local decision-makers, conservationists, professional resource managers, and the local water resources association. A 75% response rate was obtained from the 461 deliverable questionnaires.

Table 3 summarizes the results of a discriminant analysis (Klecka 1980) on the four previously identified issues and clearly indicates the extent of agreement among the groups on the four issues (Zube and Simcox 1987). Three special interest groups stand out conspicuously, real estate agents, professional resource managers and, to a lesser degree, conservationists.

The first column indicates which groups describe the landscape similarly using fixed response descriptive scales such as: beautiful – ugly, useful – not useful, and productive – nonproductive. Responses to these scales provide one indication of the kinds of information people receive from the riparian landscape and suggest what values may be important to them. Important discriminating scales were natural – unnatural, accessible – inaccessible, and unusual – common. Resource managers perceived the riparian area as significantly more unusual, more inaccessible, and less natural than did the other groups. Real estate agents perceived the area as more common and more accessible than did other groups. This suggests that the greater scientific knowledge of the professional resource managers and the real estate agents understanding of the attributes of landscapes that make them attractive as potential residential settings are probably important mediating variables to these responses.

Awareness of change, and particularly the kinds of changes noted, provides another indicator of group perceptions and experiences with the landscape and of the variability in the kinds of information received and attended to. While conservationists (members of the Sierra Club) described the landscape similarly to the majority of the respondents, they were more aware of changes in the riparian system than other groups except the resource managers. These two groups perceived changes that bring into question the continued viability of the existing natural resource base. They included less wildlife, less surface water, decreased vegetative

Table 3. Upper San Pedro area survey group mean scores on discriminant functions

Group	Description	Change	Land use	Planning
General public	-.18	-.15	-.11	-.04
Water resources ass'n.	-.06	-.01	.02	-.28
Farmers and ranchers	-.03	-.23	-.65	-.14
Real estate agents	-.47	-.55	-.46	-1.43
Decision-makers	-.02	-.24	-.06	-.71
Conservationists	-.18	.69	.87	.91
Resource managers	1.43	.96	.75	1.49
% Variance explained	84.0	72.8	55.4	68.6
Significance	.000	.000	.000	.000

growth and increased farms. On the other hand, real estate agents perceived no change in surface water, increased vegetative growth and fewer farms.

In identifying appropriate land uses, the landscape preservation interests of the conservationists and managers, and the farming and development interests of the other two groups signal potentially conflicting value orientations. Real estate agents were the strongest supporters of flood control measures while conservationists and resource managers strongly supported the use of the area as a nature preserve. Flood control in Arizona has traditionally meant structural measures that enhance opportunity for adjacent development. Local decision-makers, probably with an eye on the local economy, were most supportive of developing the area for public recreation. Farmers and ranchers were supportive of the continuation of agricultural activities, reflecting their personal utility functions and desired life styles.

It is, however, on the issues of the adequacy of planning that the greatest differences emerge. Over 60% of the real estate agents viewed existing levels of planning as adequate while all other groups perceived planning as inadequate, a perception held by 57% of the local decision-makers and farmers and ranchers and by between 70 and 97% of the other groups.

As in the state-wide study, the different value orientations indicated by these data suggest future difficulties in coming to grips with land use allocation decisions and, perhaps most important, in de-

veloping land use patterns in the surrounding areas that are sympathetic and supportive of the environmental and aesthetic values that the Bureau of Land Management is trying and the pending legislation is designed to protect in the riparian zone.

The third study focused on five large development projects proposed for the urban-rural edge of Tucson (Sell *et al.* 1986). The projects ranged in size from approximately 700 acres to 1200 acres. Four of the sites were representative of the Sonoran Desert vegetation type, the saguaro-palo verde association, with dominant plant species including saguaro (*Carnegieagigantea*) and prickly pear cactus (*Opuntia sp.*) and palo verde (*Cercidium sp.*). The fifth site was predominantly open with rural uses including agriculture, a guest ranch and scattered housing.

The objective of this project, which can best be described as a pilot study, was to investigate the perceptions of and responses to major landscape changes of persons living in close proximity to these sites. A random sample of 30 individuals living within one mile of each site was interviewed by telephone. Of particular significance to this paper are their perceptions of the costs and benefits of these changes.

Responses to the costs and benefits issue were mixed. Nearly one third of the respondents saw the change as a positive factor because it would increase the value of their property. Twelve percent perceived no effect and the remainder, 58%, commented on a range of costs that might accrue to themselves and others. The most frequently men-

tioned costs, in decreasing importance, were: increased traffic, increased population, urban development, and loss of natural scenery or environment.

While not stated explicitly, implicit in these responses to change is the image of a valued personal-residential landscape that is low density and more rural in character than suburban. Landscape factors that appear to be playing mediating roles in perceptions of change were the magnitude of the change, proximity to the center of Tucson or to environmentally sensitive landscapes and contrast with the surrounding landscape. These are not independent factors. The largest projects were farthest from the center of the city and, therefore, frequently most in contrast with the surrounding landscape.

Within the limits of the telephone survey and available census data for the study areas, the effects of individual differences on perceptions of change were also explored. In general, individuals with higher levels of education were more aware of and negative about change. Age was also a mediating variable. Middle-aged respondents viewed change as a negative factor, while those over 70 were more receptive to the idea of new people and more buildings in their areas. Not surprising, long-term residents were more aware and concerned about change than newcomers who viewed change more positively. As was the case with the hypothetical farmer, past experience, personal utility functions, and social and cultural contexts were undoubtedly involved in shaping these perceptions and responses.

In summary, and from a transactional perspective, data from these three projects suggest:

1. Patterns of land use activities are important sources of information that contribute to development of landscape perceptions.
2. The same landscape is perceived differently by individuals who have had different experiences in that place.
3. Perceptions, mediated by such factors as personal utility functions – needs and desires – and social and cultural contexts, contribute to the defining of value orientations and potential responses to landscapes.

4. Individuals are supportive of land use changes when the changes are consonant with their personal utility functions and value orientations.

These three projects also illustrate that while it is possible to obtain useful information about human-landscape transactions, the methods used were limiting in that they rely on individuals self reports and other paper and pencil data gathering techniques. Not included is a recording of actual behavior in landscapes. Such information could provide documentation of on-site physical transactions, and especially of changes in the landscape.

Landscape ecology, landscape values and landscape planning

Landscape ecology draws upon the scientific foundations of the physical and biological sciences. It contributes in important ways to our understanding of heterogeneous landscapes – to understandings of their structure, of interactions among the elements of the landscape and of changes associated with natural events and human interventions. Landscape planning attempts to allocate land use activities such that human needs and desires are satisfied while minimizing the disturbance effects of human interventions. Understanding the range of landscape values held by individuals and groups affected by planning recommendations and decisions is essential to the development of socially responsible and supportive landscapes. There are not, however, any systematic ways of linking values information, obtained from social science research methods, with landscape ecological data obtained from biological and physical science research methods. The problem of different conceptual frameworks and units of measurement, and of communications difficulties inherent in such an undertaking have been discussed in detail elsewhere (Wohlwill and Zube 1980, Bennett 1980). Nevertheless, values information can be used effectively to identify landscapes that have special meanings, to identify potential conflicts among special interest groups early in the planning and management decision-making process, and to identify needs and opportunities for education of the public about

landscapes and the probable consequences of alternative planning recommendations.

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