5 Assessment of Coastal Wetlands in Dennis, Massachusetts

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Introduction

Throughout the 1960s it became increasingly apparent that local citizens and governments were losing the ability to protect those qualities of the environment that they held most dear. This trend is most pronounced in areas rich in natural resources and cultural heritage, such as the nation's coastal zone, where everyone seems to want to live, even if only for a few days each year. Our increased national affluence has made this a real possibility for an overwhelming proportion of the population. The result is that the small coastal communities that had thrived on a moderate level of tourism are now overrun and foundering. Growth in many of these communities is outstripping all expectations as wetlands are filled and new development destroys scenic views. The blight of tourism is slowly diminishing those qualities that were once most highly prized.

Local citizens are left feeling helpless in the wake of this unchecked growth. This sense of helplessness is particularly acute when they try to protect the visual resources that have intense emotional associations yet are difficult to describe systematically. The case study presented here illustrates how a group of citizens from the town of Dennis on Cape Cod sought to inventory and evaluate their local visual resources. This effort is part of a larger resource analysis conducted by citizens of Dennis with technical assistance from the Massachusetts Natural Resource Planning Program administered by the Soil Conservation Service (Chandler, 1976).*

The objectives of the visual resource survey are:

*The data used in this report were collected by members of the Dennis Comprehensive Planning Committee with technical assistance from Geoffrey Chandler as part of the Massachusetts Natural Resource Planning Program. This planning program has been developed by the Soil Conservation Service to offer the methods and technical assistance for communities systematically to collect, evaluate, and utilize information concerning their natural resources.

Particular thanks are due to Constance Bechard and Mary Hood Hagler for the information they provided about their town.

1. Involve a large number of people in the planning process and increase their awareness of the community's visual resources
2. Find the community's special image of its land and preserve this image for future residents
3. Determine which local landscapes are preferred by local citizens
4. Provide communities with useful information on landscape quality for practical planning purposes (Soil Conservation Service, 1977)

To meet these objectives, two types of information concerning local perceptions of the Dennis landscape were collected. The first type is used to classify landscape views based on their perceived similarity; the second provides a rating of the scenic value of these same landscape views.

Procedure

Preparation for the visual resource inventory began in the spring of 1976 with the appointment of a committee of concerned citizens. In order to develop a sample of landscape views, each member of the committee indicated on a local street map views that he or she considered representative of the range of views in Dennis. Each of these views was photographed in color using a 35-millimeter wide-angle lens. The 5-by-7-inch prints of these scenes were borderless with a mat finish and mounted on thin cardboard. The committee then selected the 56 photographs that it felt most accurately portrayed the range of landscapes in Dennis.

The cooperation of a random sample of registered voters was then sought to evaluate the visual quality of these 56 landscape views. A total of 96 citizens contributed judgments of landscape quality by sorting the photographs according to one of two different sets of instructions. In the first set the participants were told:

> Each of these photographs represents a landscape view found in Dennis. For the purposes of this study, the "landscape" may be thought of as all the various elements that you see in the photograph.
>
> Please sort these photographs into piles containing other landscapes which you feel are similar. We request that each pile you form have three or more landscapes each. You may make as many piles as you like.

In addition, for each pile the participants were asked to:

> describe in a few words or phrases those characteristics that best represent the similarities of the landscapes in the group.

The second set of instructions asked the participants to:

> Sort the 56 photographs into 7 piles according to the scenic value of the landscape in the photos. In pile #1, place 3 landscapes which you think have the highest scenic value. In pile #7, place 3 landscapes which you think have the lowest scenic value. From the remaining 50 landscapes, place the 7 with the highest scenic value in pile #2, and the 7 with the lowest scenic value in pile #6. From the remaining 36 landscapes, place the 11 with the highest scenic value in pile #3, and the 11 with the lowest scenic value in pile #5. Place the remaining 14 landscapes in pile #4.

Each respondent was then randomly selected to answer one of two additional sets of questions investigating the different factors that contribute to the scenic value of the landscape. In one case they were instructed to:

> describe in either a few words or phrases those factors which add the most to the scenic value of pile #1. . . . Identify those factors which detract the most from the scenic value of pile #7. . . . Describe those factors which make the scenic value of pile #4 mediocre.

In the other case respondents were provided with a checklist of 56 factors that were thought to influence scenic value. The respondents were asked to:

> identify three landscape factors that add to the scenic value of each of the three photographs in pile #1. . . . Next identify three landscape factors that detract from the scenic value of each of the three landscapes you placed in pile #7. . . . Now take the first six photographs from pile #4 and for each of these landscapes identify three factors each which add and detract from the scenic value of these landscapes.

The participants' recorded responses were later analyzed by the local citizens' committee and a technical assistant.

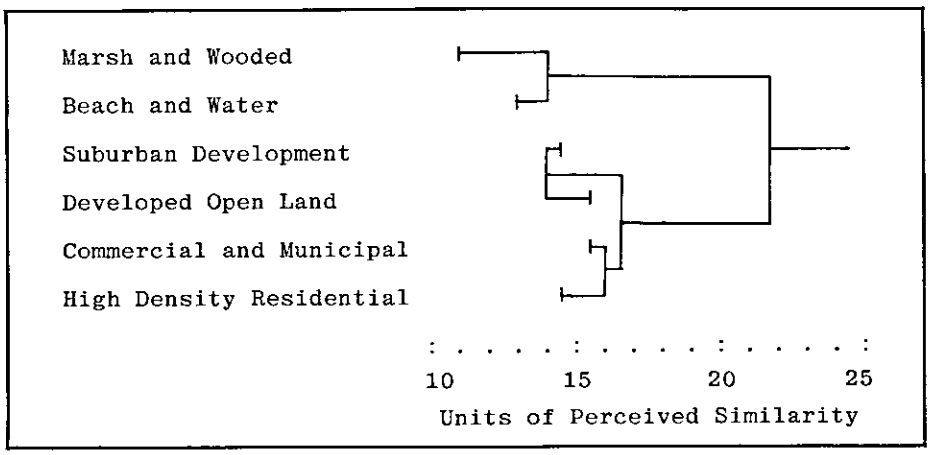

Figure 5.1. Perceived similarity among the landscape types in Dennis, Massachusetts.

Results

While the citizens who participated in the visual resource survey were selected randomly from the current list of registered voters, it is not possible to test their representativeness of the total population in Dennis. The town has grown so fast in the past decade that local census data are outdated and current population characteristics are unknown. However, the participants do represent a full range of ages, occupations, sex, residential neighborhoods, and lengths of residence. In addition, there are no significant differences among the groups of participants who performed the three different sorting tasks. Possibly the most important test of representativeness is that the town folk seem to accept the validity of the results and are comfortable with its representation of their point of view.

Conceptual Classification of Landscapes

A total of 27 citizens sorted the landscape views according to their similarity. Using a clustering procedure developed by Palmer and Zube (1976), the judgments of landscape similarity made by these citizens are aggregated into a conceptual classification of the different landscape types in Dennis. Six distinct types are identified: (1) marsh and wooded landscapes; (2) beach and water landscapes; (3) suburban development; (4) developed open lands; (5) commercial and municipal landscapes; and (6) high-density residential landscapes. A diagrammatic summary of the perceived similarity among these types is shown in Figure 5.1. A description of the essential characteristics of each landscape type is obtained through a systematic content analysis of the words and phrases that the participants used to characterize their piles of similar landscapes.

Marsh and Wooded Landscapes

These are perceived to be the most "natural" scenes in Dennis. "They are the open spaces we want to protect and keep for birds and men alike." Evoking a sense of "peacefulness" and "beauty," this type is closely identified with the "Cape Cod landscape." As illustrated in Figure 5.2, a wide variety of wetland types are represented, ranging from coastal marshes to shrub swamp. The identifying characteristic as perceived by the participants is the comparatively lush vegetation pattern, which varies from low-lying "marshland" to higher "woodlands." Those wooded areas represented by the landscape sample are included in this class.

It is interesting to speculate that the more wooded scenes might have been placed in a class of their own if suitable photographic representations had been available. However, in the Cape's gently undulating topography, it is

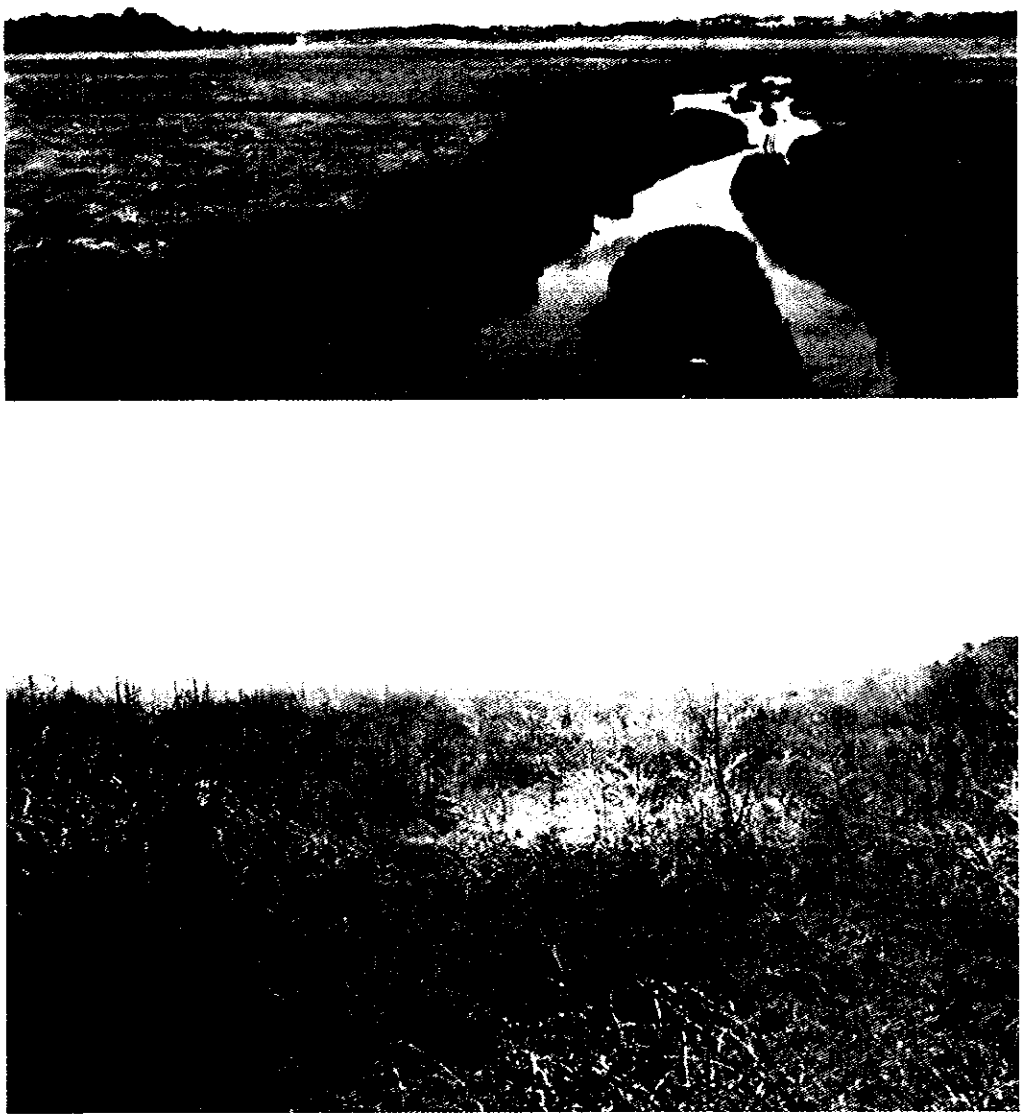

Figure 5.2. Marsh and wooded landscapes of high scenic value (*top*) and low scenic value (*bottom*).

Figure 5.3. Beach and water landscapes of high scenic value (*top*) and low scenic value (*bottom*).

nearly impossible to photograph the woods because of the trees in the way. Support for this possibility comes from a study of Connecticut River Valley landscapes, in which open meadows enclosed by woods were found to be conceptually different from forested hills (ibid.). If a separate Woodlands Landscape class did exist, this past research indicates that it would be closely related to Marsh Landscapes.

Beach and Water Landscapes

The interface of "beaches and sand dunes" with "saltwater" is the dominant conceptual characteristic of this type, as exemplified by Figure 5.3. Therefore, a tidal salt marsh is perceived as part of this class when the tide is in and among the marsh landscapes when the tide is out.

These scenes are generally "unspoiled" and "void of human habitation"; appropriate human presence is manifested through a recreational attraction such as "swimming and fishing." The participants in this survey are sensitive to the use of certain areas in this landscape type by "tourists," while others are "for the year-round resident who wants to get away from the tourists." These scenes are "attractive" in their more natural state but are beset by the pressures of "capitalistic endeavor," which invariably creates a sense "that is not very appealing to the eye." This degradation through private exploitation becomes more significant because of the important role this landscape type plays in the local perception of the Cape's regional identity.

Suburban Development

In describing suburban development, the role played by natural elements, the presence of water, or aspects of landform are rarely mentioned. These are "low-density residential areas" and "quiet country lanes" that pass "through the countryside without houses directly on the roads." This is the "hometown Cape" in which the "locals" live. Participants frequently distinguish the more traditional older developments from the newer, more modern forms within this type. For instance, in grouping photos one participant separates "single-family dwellings in developments" from "quiet country roads with vintage houses." Figure 5.4 illustrates a residence and a highway that are both from this landscape type.

Developed Open Land

Developed open land is illustrated in a small group of scenes depicting open land associated with some form of development (Figure 5.5). Included in this group are a cemetery, a power line right-of-way, a golf course, and a churchyard. Their distinguishing characteristic is that they are perceived as "developed areas that exhibit compatability with the environment." Participants commonly associate them with one of the other developed landscape types—sometimes with the suburban development because they are "historic" and conceptually part of the "hometown Cape," and other times with the commercial and municipal landscapes because of their "public service" character.

Commercial and Municipal Landscapes

Different types of nonresidential developed areas are gathered together within this conceptual class, which is illustrated in Figure 5.6. Among those mentioned are a shopping center, school, industrial area, commercial establishment, police station, church, and various other service structures. As a class, descriptions of landform, cover types, or water are totally absent. This is Dennis at its worst in the eyes of the local residents. One resident exclaims, "Horrid! They should be forced to restore and start over." However, most respondents seem less belligerent, and many are even resigned to the inevitability and probable growth of this kind of landscape. As one respondent notes, "These are the necessary evils of civilization." This congested and objectionable landscape is definitely not considered part of the regional image of Cape Cod and could be found in Anywhere, USA.

High-Density Residential Landscapes

High-density residential landscapes, exemplified in Figure 5.7, are perceived as the places where the "off-Cape" population stays. Interestingly, they are not called "homes" but "rental units," a type of commercial venture. Termed "claptraps" and "schlock residential" areas, they

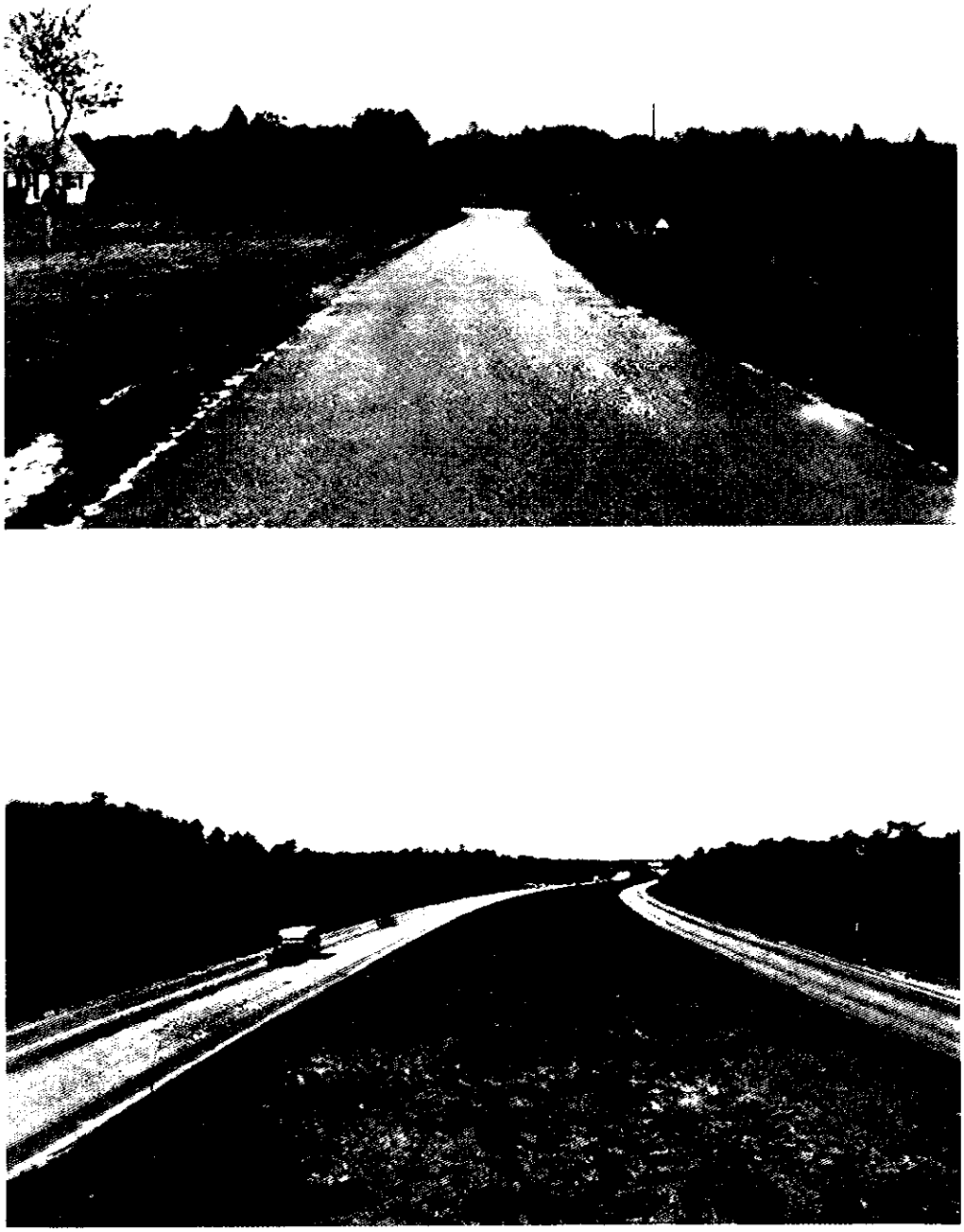

Figure 5.4. Suburban developments of high scenic value (*top*) and low scenic value (*bottom*).

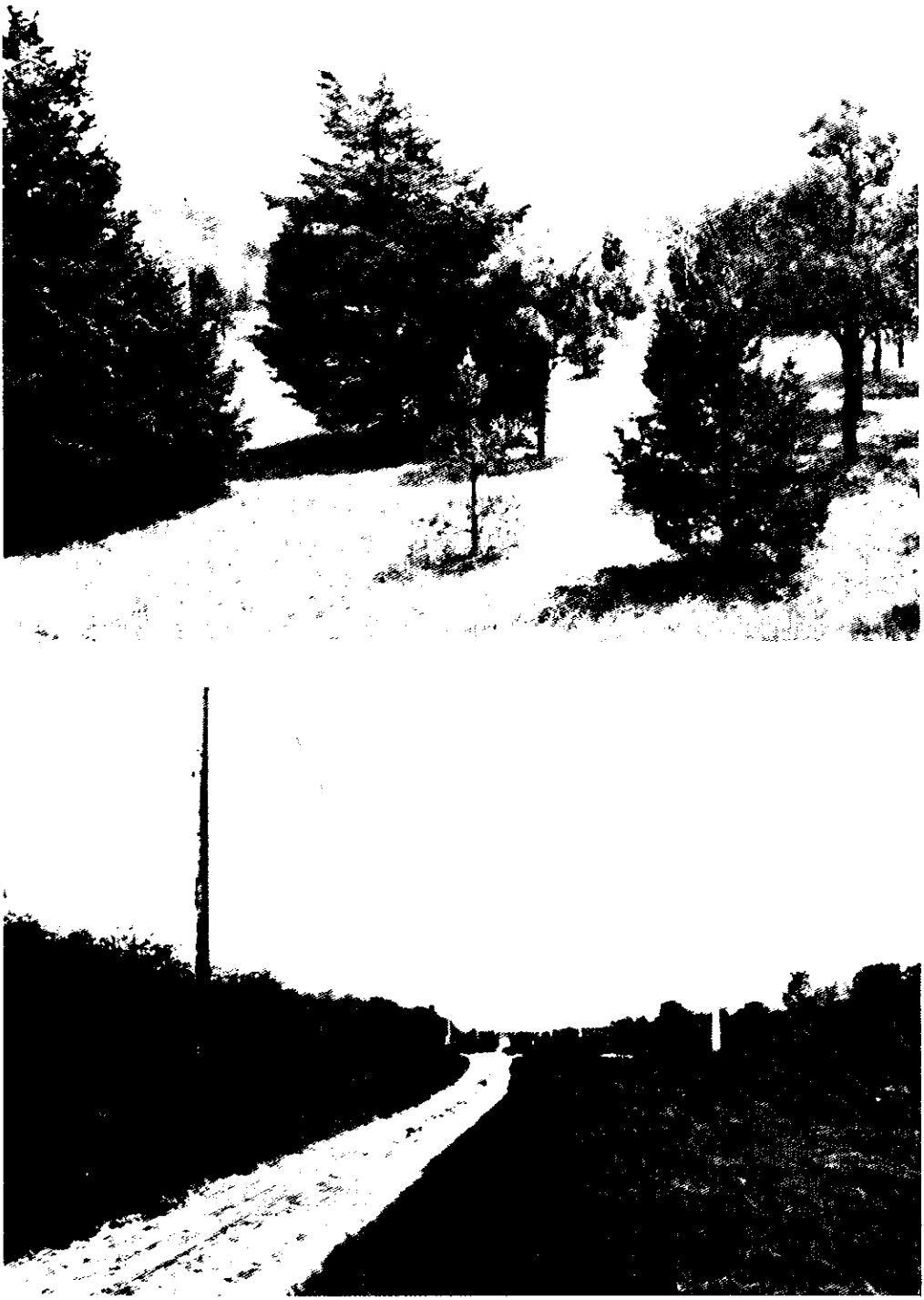

Figure 5.5. Developed open land of high scenic value (*top*) and low scenic value (*bottom*).

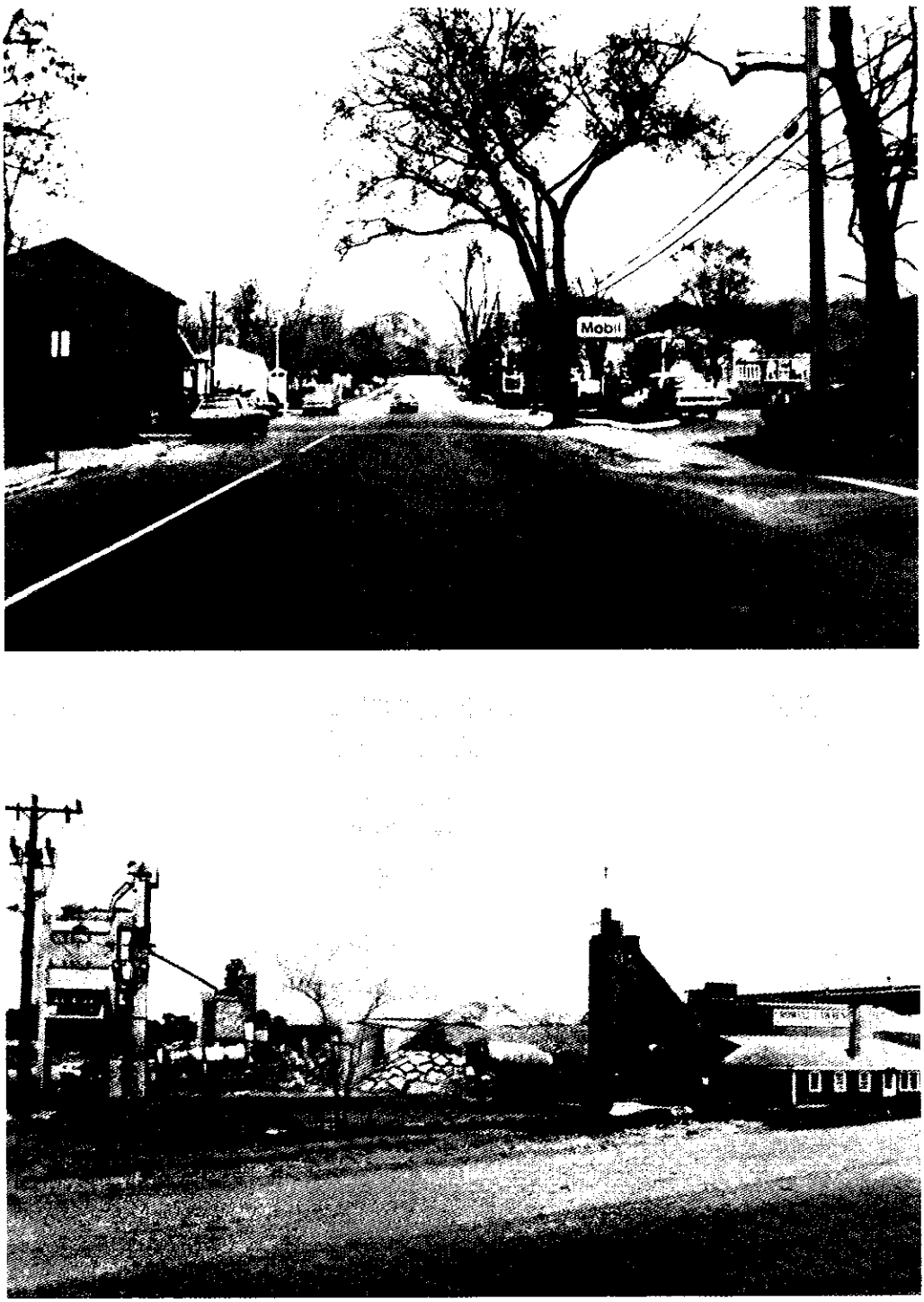

Figure 5.6. Commercial and municipal landscapes of high scenic value (*top*) and low scenic value (*bottom*).

Figure 5.7. High-density residential landscapes of high scenic value (*top*) and low scenic value (*bottom*).

are a scenic blight in the eyes of the local residents. There is some resignation that they are "necessary," but there is also substantial concern that they are rapidly encroaching upon the most valuable areas of the Cape. One respondent observes acutely: "Here's some near epitome of the gross overpopulation of an area. Everyone wants a piece of the beauty and bit by bit the beauty is removed." In this case the beauty comes from the beach and water landscapes, which have special qualities that are conspicuously absent from the suburban landscapes where the respondents live.

Judgments of Scenic Value

Two groups of citizens were asked to sort the landscape views according to scenic value: 37 were asked to use their own words or phrases to describe the qualities that added or detracted from the scenes; 32 were given a landscape-factor checklist as a means of providing similar information. The scenic resource value for a particular landscape view is the mean rating it received from the respondents. The scenic resource values for all landscape views as judged by both groups are compared using *t*-tests. In only two instances are the judgments significantly different ($p < .05$), therefore the scenic resource values used below are calculated from the ratings by all 69 respondents.

A clear pattern emerges from the content analysis of the words and phrases respondents used to describe the factors that contribute to the landscape's scenic value. The most scenic landscapes are overwhelmingly perceived as "natural" and even as "wild" by some. The presence of water and the dominance of "green" vegetation is mentioned only in connection with these highly valued scenes. Respondents seem to favor a pastoral notion of what is scenic, characterizing it as "well kept" and "spacious" with "distant prospects," the way Cape Cod "should look." There are no "gross man-made additions," and where buildings appear in the scene they are "distant" and "fit in on the Cape." There also seems to be a compositional value seen in the "interplay of land and water, colors and shapes."

The least scenic landscapes are perceived as "cluttered" and "unimaginative" views dominated by misfit features: "signs," "overhead wires," "broken asphalt," "supermarkets," "concrete mixing plant," and the like. These are "lifeless" and "artificial" scenes "without trees and bushes."

Those scenes that are given moderate ratings are primarily characterized as being "ordinary" and "anywhere," not just Cape Cod. Misfit features also characterize this group, but they are less dominant than in the least scenic landscapes.

The Scenic Value of Landscape Types

The usefulness of the visual resource survey in Dennis becomes more apparent when the scenic value for each landscape type is compared with the other types. An analysis of variance ($F = 642.4$, $df = 5, 3789, 3794$, $p < .001$) indicates more significant differences in scenic value among rather than within the landscape types. The differences in scenic value between landscape types are investigated further using *t*-tests, shown in Table 5.1. In most cases significant differences are found. However, no significance is found between those pairs of landscape types that are shown in Figure 5.1 as being conceptually most similar. For instance, the marsh and wooded landscapes and the beach and water landscapes are perceived as being very similar and thus do not have significantly different scenic values. However, they are both perceived as quite dissimilar from the high-density residential landscapes, which have a significantly poorer scenic value.

The results of the landscape-factor checklist are summarized in Tables 5.2 and 5.3 according to landscape type and give some indication of what factors influence scenic value for each type. The pattern that emerges from these tables corroborates the prior content analysis of what contributes to scenic value. A romantic notion of the most scenic prevails, while misfit characteristics dominate the least scenic landscapes. This pattern can also be seen by comparing the examples in Figures 5.2 through 5.7 of high and low scenic value for each landscape type.

A more careful examination of Tables 5.2 and 5.3 provides several additional insights. For instance, both the beach and water and marsh and wooded landscapes are valued for their "naturalness." However, the marshes are

Table 5.1 *T*-tests Comparing Mean Scenic Value for Each Landscape Type

Landscape Type	n[b]	$\bar{x}$	*T*-value[a] Beach	Marsh	Suburban	Open Land	Commercial
Beach and water	759	2.99					
Wooded upland and marsh	552	2.91	1.10n.s.				
Suburban development	759	3.47	-8.04***	-8.80***			
Developed open land	276	3.52	-5.85***	-6.50***	-.54n.s.		
Commercial	828	5.32	-39.78***	-38.92***	-33.36***	-20.62***	
High-density residential	621	5.27	-37.78***	-37.09***	-31.38***	-19.74***	.98n.s.

[a] The *t*-values reported here are for independent groups with unequal variances; therefore the values are an approximation.
[b] This value is the total number of ratings made by 69 respondents of all the scenes within a landscape type.

Significance: n.s. $p \geq .05$, *** $p < .001$

Table 5.2 Landscape Factors That Add to the Scenic Value of Each Landscape Type

Rank[a]	Landscape Types: Beach and water	Marsh and wooded	Suburban development	Developed open land	Commercial and municipal	High-density residential
Highest:						
1.	Naturalness	Serenity	Serenity	Serenity		
2.	Water	Vastness	Local character			
3.	Shoreline	Naturalness				
Moderate:						
1.	Water	Naturalness	Vegetation	Serenity	Building color	Building design
2.	Depth of view	Natural color	Natural color	Naturalness	Building design	Walls and fences
3.	Natural color		Naturalness		Natural color	
4.			Depth of view			

[a] Landscapes with the highest scenic value were in pile #1. Those with moderate scenic value were in pile #4.

Note: The landscape-factor checklist was completed by 28 respondents.

Table 5.3 Landscape Factors that Detract from the Scenic Value of Each Landscape Type

Rank[a]	Landscape Types					
	Beach and water	Marsh and wooded	Suburban development	Developed open land	Commercial and municipal	High-density residential
Lowest:						
1.					Overhead wire	Bare earth
2.					Barrenness	Barrenness
3.					Cars and trucks	Building design
4.						Overhead wire
5.						Building material
6.						Building setback
Moderate:						
1.	Horizon line	Horizon line	Roads	Overhead wire	Overhead wire	Building color
2.	Building design	Barrenness	Pavement	Roads	Cars and trucks	Building material
3.	Overhead wire	Natural color	Cars and trucks			Straight line
4.	Flatness					

[a] Landscapes with the lowest scenic value were in pile #7. Those with moderate scenic value were in pile #4.

Note: The landscape-factor checklist was completed by 28 respondents.

primarily valued for their emotional associations—their serenity, vastness, and uniqueness. In contrast, those aspects of a beach that contribute to its quality are physical—the water, sand, and shoreline.

Another interesting implication of these tables is that vegetation and natural materials play an important role in the scenic value of the less densely developed areas. Where roads, overhead wires, and the like are not effectively screened, scenic value drops. In contrast, building characteristics such as materials, design, color, and setback become important in the more densely developed landscape types. In these situations the buildings are so concentrated or massive that they cannot be completely screened. All that one expects is the mitigation of a barren appearance through appropriate landscaping.

Discussion

Sometimes it is awkward to be a landscape planner committed to the development of systematic methods for consideration of the landscape as a visual resource. The public often responds with skepticism. It is a measure of success that the results of a visual resource survey seem so obvious. Yet few critics would ever give prior support to the possibility that there is substantial agreement regarding the landscape types perceived in an area as well as what contributes to their scenic value.

In Dennis there seems to be a reasonable acceptance of the results of the visual resource survey, probably because of the large degree of local control and participation throughout the entire process. This survey is one of the reasons why Dennis was named the All-American City for 1978. When bestowing the award, the National Municipal League of Cities and Towns stated that it was particularly impressed by the example Dennis provided other towns for (1) citizen participation, (2) comprehensive planning, and (3) conservation acquisition and historic preservation. The visual resource survey contributed to each of these areas.

One important ramification of the visual resource survey is its utility as a powerful tool for education. It has brought "visual quality" out of the closet and made it a respectable topic in local planning. It is now clearer to the local decision-makers that there are ways to describe landscape appearances systematically. Even more important, there is much more substantial agreement among town residents than anyone ever expected. In addition to being used at town meetings, photographs are being shown to students in the public schools to make them more aware of their local visual resource.

A second ramification of the survey is its influence on the new zoning bylaws for the town of Dennis. While all the changes in the old zoning bylaws are founded on other aspects of the comprehensive Natural Resource Planning Program survey, they also have a visual basis that is recognized by the local citizens. For instance, the study's results suggest that the presence of any structure in the foreground becomes so dominant in an otherwise beach and water or marsh and wooded landscape that the pastoral image is destroyed. The possibility of this visual incompatibility is given some credence by the single landscape view that did not clearly belong to any landscape type—a scene viewed across a salt marsh toward a densely developed residential area. Other areas where beach cottages composed the foreground were obviously judged high-density residential landscapes. Therefore, future commercial and high-density residential developments will be concentrated in those areas already identified with these landscape types. Through zoning, a serious attempt is being made to halt the sprawl of these landscapes and to encourage their infilling. An attempt is also being made to protect the integrity of undeveloped natural areas. Those areas near coastal beaches and marshes are rezoned from a minimum residence lot size of 20,000 square feet to a minimum of 60,000 square feet. These areas have the greatest scenic value and are least able visually to absorb development. The remaining natural landscapes are rezoned to a minimum lot size of 40,000 square feet. All areas that are already considered suburban development remain at the previous minimum lot size of 20,000 square feet.

The third ramification of the survey is the town's commitment to acquire publicly those areas that are visually most valuable. In 1979 the

citizens of Dennis purchased 25 acres of prime marshland and 200 acres of beachfront. These are added to the town's already extensive public-conservation and recreation areas.

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