Evaluation and Recommendations Concerning the Visual Resource Inventory and Evaluation Systems Used Within the Forest Service and the Bureau of Land Management[1]

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Abstract: This paper is an investigation of the Visual Management System (VMS) and the Visual Resource Inventory and Evaluation Process (VRIEP). Questionnaires were developed and sent to persons who were experienced with VMS and/or VRIEP. VMS has been found easier to understand and apply than VRIEP. The methodology of VRIEP has been found to he a more complete approach than that of VMS, Sensitivity levels in both manuals were found to he the sections most difficult to understand, apply, and in need of most improvement and research. Recommended are changes to methodology and criteria as well as the development of a system national in scope with regionally adjustable criteria.

INTRODUCTION

Two methodologies were investigated in this paper;[3/] the Visual Management System (VMS) used within the Forest Service and the Visual Resource Inventory and Evaluation Process (VRIEP) used within the Bureau of Land Management (BLM).[4/] This study was conducted during 1977.

METHODS AND PROCEDURES

The primary objective of this project was to discover both the merits and problems of VMS and VRIEP and to make recommendations for clarification and improvement of the methodologies. VMS and VRIEP have had wide use in USFS and BLM. The writer contacted persons with knowledge of and experience with either VMS or VRIEP in USFS and BLM, and other professional institutions such as private firms and universities.

Separate questionnaires were developed for VMS and VRIEP. Respondents were asked to rate the methodologies as well as the manual. Questions were organized so that comparative analysis of the sections and the methodologies would be possible. The forms of the questions were of four types: yes, no, and don't know; a 5-point scale of 0-2-4-6-8 with adjectives that

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[1/] Presented at the National Conference on Applied Techniques for Analysis and Management of the Visual Resource, Incline Village, Nevada, April 23-25, 1979.

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[3/] Based on Grden, Blaise G. 1978. Evaluation and Recommendations Concerning the Visual Resource Inventory and Evaluation Systems Used Within the United States Forest Service and the Bureau of Land Management. Unpublished MLA thesis, Landscape Architecture and Environmental Planning Department, Utah State University, Logan, Utah.

[4/] BLM has since revised VRIEP which is now called Upland Visual Resource Inventory and Evaluation (UVRIE). The author has eliminated any comments or results which no longer apply to VRIEP due to the update.

corresponded to the numbers, rank order; and open-ended questions.

A SUMMARY OF DIFFERENCES AND SIMILARITIES OF VMS AND VRIEP QUESTIONNAIRE RESULTS

The problems of VMS and VRIEP/UVRIE are many and complex. There are general problems in understanding the methodologies and resistance from persons not experienced in evaluating visual resources. Landscape architects tended to evaluate the systems higher than other professionals. However, all respondents tended to agree on the hierarchy of problems. VMS manual was considered to be biased in terms of mountainous west examples and experiences, while VRIEP (UVRIE) manual was considered to be biased toward Colorado Plateau examples and experiences. Neither was considered to be national in scope.

Nearly all of the VMS questionnaire respondents were landscape architects, while the VRIEP respondents were approximately one-third landscape architects and two-thirds other professionals. VMS respondents applied the system more frequently, but to less acreage than VRIEP respondents. Landscape architects applied VRIEP on an average to larger sites than other professionals. The total average area in which landscape architects applied VRIEP was 3.6 times greater than other professionals (see Table 1).

Table 1 - Respondents and their application of VMS and VRIEP.

Respondents	VWS	VRIEP	
	60 landscape architect 1 forester	11 landscape architects	18 other professionals
Average times applied	5	2.5	2.8
Average hectares (acres) each application	116,000 (286,600)	424,929 (1,050,000)	105,498 (260,700)
Total application hectares (acres)	591,000 (1,460,700)	1,052,320 (2,625,000)	295,394 (730,000)

Sensitivity Levels

Sensitivity levels in both manuals were found to be the sections most difficult to understand, apply, and in need of most improvement and research.

In prescribing visual resource management classes, this study and research by Burns[5/] both found that sensitivity levels were essential.

A higher percent of VRIEP respondents indicated that the sensitivity level section met the objective. The higher rating by VRIEP respondents may be due to the more complex criteria resulting in a more complete approach.

VMS respondents rated the clarity of sensitivity levels higher than VRIEP respondents. This shows the difference of manuals as well as more complex VRIEP sensitivity levels.[6/]

VMS respondents had a greater mean range than the VRIEP respondents concerning the ease of application of sensitivity level criteria. This indicates that some of the sensitivity levels of VRIEP are easier to apply and some are harder to apply than VMS criteria.

The respondents indicated that sensitivity level produces more unwanted bias than any other section of the systems, with VRIEP being more biased than VMS. The writer's opinion is that VRIEP criteria are more complicated and the data used in the criteria are difficult to obtain, resulting in more subjective decisions.

Visual-Distance Zones

Research by Burns[5/] indicated a concern for the value placed on unseen areas. The respondents to this study agreed and rated unseen area treatment as fair.

According to 75 percent of the respondents, distance-visual zones were valid criteria in determining sensitivity levels. The clarity of the manual in defining and explaining distance-visual zones was rated higher by VMS respondents. This may be due to the fact that VMS manual is more elaborate.

Applying the concepts of visual-distance zones was considered easier by VMS respondents. This may be due to the fact that the VMS respondents applied the system more times and VMS manual was considered clearer.

Scenic Quality

The respondents of VRIEP and VMS questionnaires stated that the scenic quality or variety class section measures variety or diversity. VRIEP respondents rated the "scenery units" higher than the VMS respondents rated character types. This may be because scenery units are easier to understand and to apply.

VMS respondents stated that the variety in the landscape was an accurate factor in measuring scenic quality while the VRIEP respondents stated it was between moderately accurate and accurate. This difference may he due to the fact that VRIEP also includes the factors of intrusions and uniqueness in the rating of scenic quality.

[5/] Burns, Jim. 1976. Summarization of activities, findings, and recommendations of the workshop on sensitivity level determinations for the BLM's visual resource program, Tahoe, Nevada, 16 November. (Mimeographed.)

[6/] Sensitivity level criteria in UVRIE have been simplified.

VRIEP landscape architect respondents stated that the concepts used for rating the scenery units were easier to apply and more clearly defined in the manual than VMS respondents rating of the features and classifying them into ABC classes. This could be due to the use of a numerical rating system in VRIEP which is easier to understand and carry out.

Approximately 25 percent more of the VMS respondents than VRIEP respondents stated that the methodology of the scenic quality section produced no unwanted bias. The differences of the scenic quality rating may be due to the complex methodological additions made by VRIEP over the VMS. In other words, VRIEP respondents felt their system was more biased.

Visual Resource Management Classes (Goals)

A greater percent of VMS respondents agreed with the matrix which determines the appropriate visual resource management classes than did VRIEP respondents.

The clarity of the manual in which the management classes was explained was rather higher by VMS respondents than by VRIEP respondents. This may be explained by the quantity of examples contained with VMS manual and the amount of text explaining the classes.

General

VMS and VRIEP respondents rated "applying the system" as the most used and the most helpful method in understanding the systems. The respondents rated reading the manual as the second most used method in understanding the systems. VMS respondents rated reading the manual as the second most helpful method while the VRIEP respondents rated it as the least helpful method.

The comprehensibility, format, and text of the VMS manual were rated higher than the VRIEP manual was rated by VRIEP respondents.

The above differences can be understood by reference to the manuals. VMS manual is more elaborate, with color photographs, illustrations, and examples. VRIEP manual was in "draft" form with fewer illustrations and no photographs [7/]

Approximately 44 percent of the respondents indicated that additional background would be helpful to bring more credibility to the systems.

VMS respondents' professional judgment agreed more with the final results of VMS than VRIEP respondents' professional judgment with the final results of VRIEP. This may he due to the fact that VMS respondents have used the system more often over a long period of time and have become used to it.

ISSUES AND RECOMMENDATIONS

Introduction

The following recommendations are based on the results of the questionnaire and current research.

Why two different systems? Now that each has been tested in the field, USFS, BLM and other land management agencies should collaborate and design an integrated system. The systems should contain the same methodology and terminology. The integrated system which is national in scope could be used as a core with allowance for variations, as the system is tested in the different physiographic regions. One national core system would eliminate problems arising when a project crosses more than one agency's land and areas where agencies' boundaries are adjacent. One system would insure equal treatment of the visual resources.

One of the frequent comments of respondents from non-western, mountain regions was that the manual should be more national in scope, concepts, and examples. Each region is composed of different natural features. Different historical events influenced attitudes toward the land and structures such as agricultural fields, buildings, cities, and travel routes. The inhabitants vary in number, character, culture, personality, experience, and economics. (Starkey and Robinson 1969, Sonnefeld 1966). The new manual should include an explanation explaining to the user that the criteria must be "fine tuned" for each physiographic region. What is used in the Rocky Mountains cannot be applied in the Gulf Coastal Plain. Some areas of USFS and BLM have adjusted the criteria to fit their needs better, such as in Kootenai National Forest, Arizona, New Mexico, and in the Colorado BLM offices.

The new manual should integrate supplemental references, appendices, bibliographies, and other source materials to help support the methodology. The methodology would then be more helpful to professionals and the general public.

A numerical rating system as in VRIEP/UVRIE would simplify the scenic quality and sensitivity evaluating process and render the system adaptable to computers. The weight of the criteria should be regionally adjustable in range and value. UVRIE manual gives examples

[7/] The UVRIEP manual presently used has more illustrations but still lacks photographic examples.

of the adaptability of their system for computer use.

Figure 1 shows the flow diagram for the recommended system.

Scenic Quality

The term scenic quality as used in VRIEP/UVRIE describes the process used to measure the scenic quality of the visual resource. Variety classes used in VMS would be appropriate if scenic quality were based only on the concept of variety. There are additional concepts which might be better used to determine scenic quality which will be discussed later in this section.

Landscape Divisions

One of the initial impressions from reading either VMS or VRIEP/UVRIE manual is that the Great Plains or the Central Lowlands, physiographic provinces of the United States, would be entirely rated "C" class scenery and that need not be true.

Each physiographic province has relative levels of scenery with different visual resource characteristics. Both scale and relationship of objects are also relative in each province.

Scenic quality of the landscape can be determined by dividing the landscape into areas of similar visual resource characteristics and rating each area for scenic quality based on its inherent characteristics. Both VMS and UVRIE incorporate physiographic divisions based on Fenneman (1931, 1938).

Components of the Visual Landscape

Within VMS and VRIEP/UVRIE it is stated that landform, vegetation, and water are basic components of the visual landscape. However, VRIEP/UVRIE also includes manmade components ("cultural features"). Neither VMS or VRIEP/WRIE take directly into account animal life, an important component in the visual landscape. The components of the visual landscape should include landform, vegetation, water, animal life, and man-made objects and processes. The arrangement of the components of the visual landscape serves to create variety, vividness, and harmony, and will be investigated later in this section.

Design Elements

VMS and VRIEP/UVRIE, as well as some other visual analysis methodologies used the design elements of form, line, color, and texture to describe the components of the visual landscape. The relative importance of each element tends to vary with each physiographic region and subregion, due to atmospheric conditions and available light and other inherent landscape characteristics (Harman et al., 1973; USDA 1972, 1973; USDI 1976).

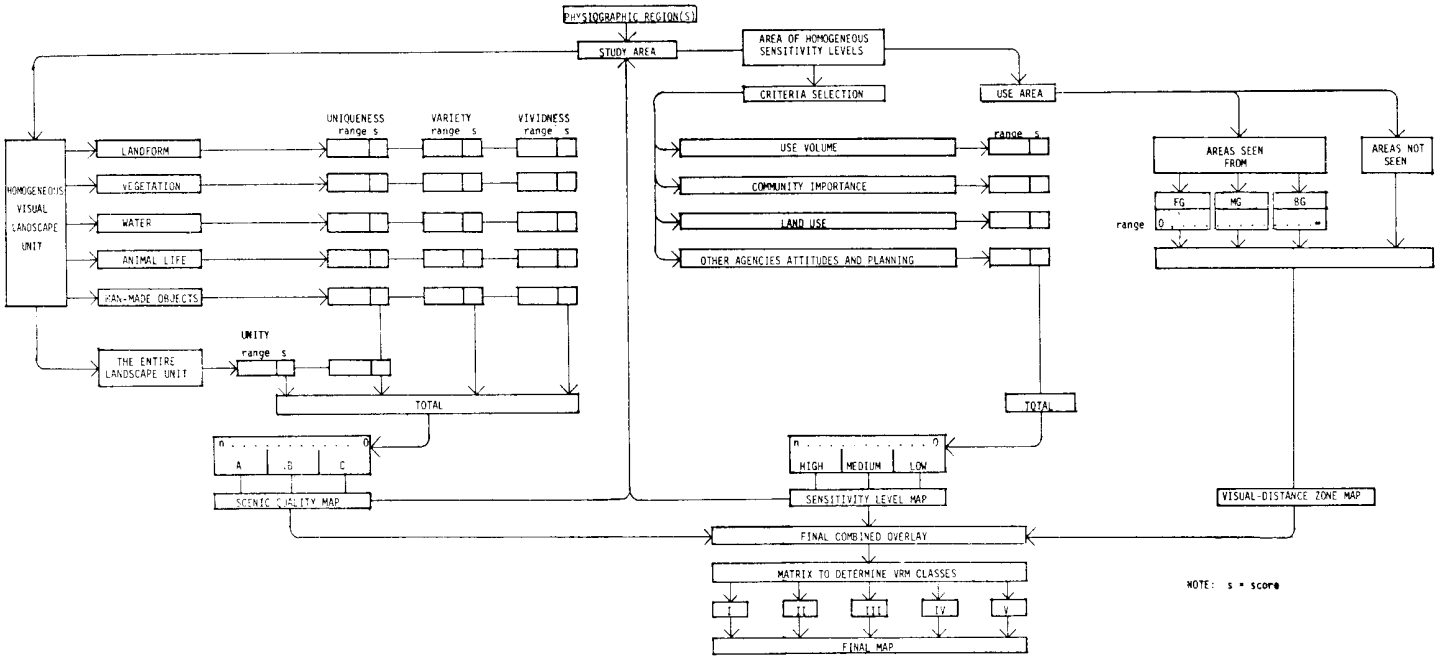


FIGURE 1 - Recommended visual resource inventory and evaluation system flow diagram.

terminology

Variety--includes the number of objects, the distribution, and the relationship in terms of scale between them. Variety is in opposition to monotony where repetition of objects is uninteresting and implies low level scenic quality. Landscapes with the greatest variety or diversity have the potential of possessing higher levels of scenic quality (Sargent 1966; Zube 1971; Litton 1971, 1972; USDA 1973, 1974; Laurie 19750[8/]

Vividness--is that quality in the visual landscape which is strong enough to make a lasting impression. Lynch (1960) uses the word "imageability," Jones (1975) "vividness or memorability," and Litton (1971, 1972) "vividness." "Contrast is the most obvious source of vividness, if it avoids confusion." (Litton 1972, p. 285).

Unity--is a single harmonious visual unit in terms of the combined quality of the landscape components. The unified landscape is not the arithmetic sum of its components, but the unity of components interacting holistically with each other. (Ocvirk et al. 1968; Handley et a1. 1970; Litton 1972; USDA 1972; Jones and Jones 1974, 1975, 1976; Jones 1976; and Laurie 1975).

Uniqueness--is the scarcity of an object or landscape in a physiographic region. The object can be physical, biological, and/or of human interest (Leopold, 1969; Leopold et al. 1971 Leopold, 1966, McHarg 1969; Handley et al., 1970; Leopold, et al., 1971; Jones 1975; Iverson 1975; [8/])

Criteria

The methodology of VMS is based upon the criterion of variety as a measurement of scenic quality while the methodology of VRIEP is based upon the criteria of variety, uniqueness, and harmony, which are not explicitly explained. Most respondents stated that variety was an important criterion in assessing scenic quality, which it is, but other criteria exist. Research has shown that variety, vividness, unity or harmony, and uniqueness are factors which assess scenic quality.

The four criteria of variety, vividness, unity, and uniqueness are generally recognized as basic in determining the artistic quality of music, painting, and landscapes. The criteria exist not only as entities but also in interaction (0cvirk et al. 1968; Litton 1972 Ocvirk and Litton do not mention uniqueness).

Methodology

VMS and VRIEP scenic quality methodologies should be modified to include the recommended criteria. The visual landscape unit can be divided into the components of the landscape: landform, water, vegetation, animal life, and manmade components. These components can be described by the design elements of form, line, color, and texture. The components and the landscape as a whole can be given a numerical rating of scenic quality determined by the criteria of variety, vividness, unity, and uniqueness. The weight and range of the components will depend on two factors: the characteristics of the components and the physiographic region in which they lie. In some regions components such as water or man-made components may be scarce or non-existent. The adjusted weight and range would have to be modified in these instances, however the criteria "uniqueness" would provide a means of compensation.

When rating the components of the visual landscape unit, they should first be rated for variety, vividness, and then uniqueness. Then the visual landscape unit as a whole can be rated for harmony, followed by rating the whole visual landscape unit for uniqueness relative to the defined physiographic region. Scenic quality classes can be determined by the sum of the scores (see table 2).

Sensitivity Levels

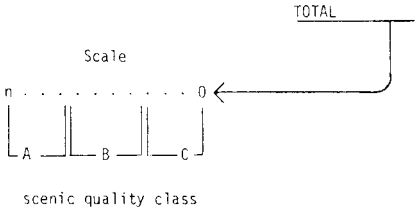
Analysis of sensitivity levels is a necessary factor for planners and managers dealing with visual resource management. Sensitivity levels serve to establish priorities as well as prescriptions for change in managing the visual environment. The concept of sensitivity level is not as easily understood or applied as scenic quality or visual-distance zones. This section will need the most research before a methodology is accepted by the majority of professionals.

In VMS, sensitivity levels are the measure of concern that a perceiver has for scenic

[8/]Paulson, Merlyn J. 1975. Western coal strip-mines, related energy conversion structure, and transmission lines: A study of visual quality, visual change, and alleviating visual siting criteria. Unpublished MLA thesis, Landscape Architecture Research Office, Harvard University.

TABLE 2. -- Table to determine recommended scenic quality

measurement criteria	components of the visual landscape	verbal description and value range (varies with region)			score
variety (Y)	landform	verbal description & weight			Y V U
vividness (V)	vegetation				Y V U
uniqueness (U)	water				Y V U
	animal life				Y V U
	man-made objects				Y V U
harmony	the landscape as a whole				
uniqueness	uniqueness of the whole				



quality, while in VRIEP sensitivity levels were ". . . an index of the relative importance or visual value of visual responses to an area in relation to others in the planning unit" and in UVRIE sensitivity levels are indications of user interest and concern for change in the visual resources. (USDI 1976, 6300.05).

Sensitivity levels should serve to measure the concern for the visual resource of persons viewing the area, persons having interest or "stock in the area" but who may never visit the area, and public agencies that have jurisdiction in the area.

Landscape Divisions

While the physiographic regions serve as a basis for division of the landscape into homogenous visual units that can be measured for scenic quality, physiographic regions can also serve as a basis for division of the landscape into homogenous sensitivity units that can be measured for sensitivity levels. There are:

> . . . differences between the people and their cultural traits in each of the physiographic provinces---differences in e ethnology, dialects, educational levels, religions, wealth, industrial or agricultural pursuits and politics. (Hunt, 1974, p. 3)

Along with physiographic regions, regional geography and United States Office of Business Economics (USOBE) have criteria to divide the landscape into regions.

Regional geographers use five major criteria to delineate areas. Man's relationship with the land or geography can be used as a basis to divide the land into regional areas (Starkey 1969).

(1) The land: its extent and quality. (2) The historical events that have been significant in influencing later land use. (3) The accumulation of structures on the land, including fields, buildings, routes, cities, and monuments. (4) The inhabitants of the land: their numbers, character, culture and rates of increase. (5) The income that inhabitants earn and the economic structure within which they earn income.

The mapping procedure of USOBE is based on demography, ethnic, cultural, and social factors of the labor force.

These examples are suggestions, however, the concept might serve to produce a broader basis for determining the criteria used to measure sensitivity levels.

Criteria

New criteria should be developed to evaluate the use area and determine sensitivity levels. The criteria should be based on the defined region and a profile of public attitudes and the consultation of sociologists, economists, recreation specialists, and representatives of other appropriate fields.[9/]).

Use areas, use volume, community importance, land use, and other agencies' attitudes and planning are criteria that can be applied in most regions to determine sensitivity levels of use areas. The criteria have been used in some part either in VMS and/or VRIEP.

The criteria should be adjusted and/or new criteria developed for each region. The criteria weight or value will depend on the particular region. Each use area can then be rated on the established criteria and range, and the appropriate sensitivity level assigned by adding the assigned scores (Table 3).

[9/] Robert. 1976. Summarization of activities, findings, and recommendations of the workshop on sensitivity level determinations for the BLM's visual resource program, Tahoe, Nevada, 16 November. (Mimeographed.)

terminology

Use Areas -- within a region should be delineated and mapped. Use areas can be places where people live, work, play, and move about. They may include cities, towns, villages, summer home sites, commercial and industrial areas, campgrounds, visitor centers, picnic grounds, water bodies, beaches, roads, and trails. The boundaries of the areas of use are determined by what areas are viewed from the use area.

Use Volume -- is determined by the number of persons in an area or traveling through an area. Perception of the landscape varies with the amount of time it is seen and the speed of movement through it.

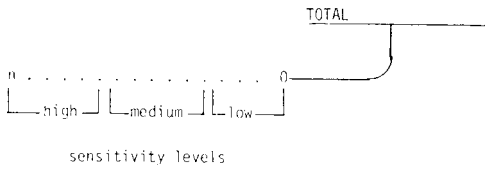
Community Importance -- is the significance placed on a use area by local, state, regional, and/or national communities.

Land Use -- is a general designation or proposed function which occurs above, on, or in the land.

Other Agencies Attitudes and Planning -- and social programs should be taken into account because different agencies represent different attitudes toward management of the visual resources. Lands administered by the National Park Service tend to generate higher values for the visual resources than most other agencies. There may be times when the function a use area may influence the viewshed of a nearby use area.

TABLE 3 .--Tableto determine recommended sensitivity levels

	Verbal description and value range (varies with region)			
Criteria	High sensitivity level	Medium sensitivity level	Low sensitivity level	Score
Use volume:	Verbal description & weight			
Community importance:				
Land use:				
Other anoncies attitudes and planning:				
Other :				



Visual-Distance Zones

Since the zones are based on distances of visual perception, it is recommended that the term visual-distance zones be used.

Visual-distance zones determine the viewed areas from use areas, and help to determine the visual sensitivity of the use area as well as the boundaries of the sensitivity area.

An observer can usually recognize that the closer one is to an object the clearer the details of the object are perceived. As distances increase away from the objects, the details become more uniform in color-value and less contrast is apparent between the objects. The other senses such as smell and touch are less acute (USDA 1972, 1973).

Criteria

There are three visual-distance zones used to describe distances in painting, photographs, and the observed landscape--foreground, middleground, and background, which are based on the details that can be perceived at a given distance.

Measurable distances such as meters and kilometers can be applied to each visual-distance zones. The measurable distances are used in VMS and VRIEP/UVRIE and are based on research conducted by Litton on national forests in the western United States (Litton 1972).

These distances are arbitrary and do not take into consideration the atmospheric conditions, seasonal or diurnal variations, or variable contextual settings (Litton 1972). These conditions can vary depending on the physiographic region. This results in possible changes in the length of each distance zone and in the weight given in the matrix to determine the visual resource management classes. The manual should contain explanations of these possible variations.

All three visual-distance zones should be used instead of the two in VRIEP/UVRIE. The foreground is different from the middleground. The background should end at infinity or at a point where the components such as landform or man-made features are not identifiable or visible. The background zone of VRIEP/UVRIE ends at 24.1 kilometers or 15 miles, but a huge structure may be viewed beyond 15 miles. The distances will vary from region to region. More than three zones may be needed in some instances such as the investigation of possible visual impacts.

Visual Resource Management Classes

Through a matrix scenic quality, sensitivity levels and visual-distance zones are brought together to determine visual resource management classes. The three major sections should be regionally adjusted as well as the matrix.

Many of the respondents stated that the terms retention and preservation were misleading and often confusing. This problem could be solved by assigning roman numerals as in VRIEP/ UVRIE, instead of terms such as preservation or retention.

The management classes ". . . provide the land manager and supporting staff with objectives for the visual appearance of landscapes that vary with the lands intrinsic scenic quality and its sensitivity to public viewing pressure" [10/]

This is just the first step. The manager and others must know how difficult it may be to achieve the visual management classes in one unit of land as in another unit.

It may appear that it would be easier to meet the least restrictive class than a more restrictive class. But no such correlation is within the system. The opposite can be the case, where it is easier to meet a more restrictive class than a less restrictive class.[10/]

The manual should explain how the visual resource management classes fit into the whole process, and that the classes are not the final decision. The desire for integration of visual absorption capability (VAC) into the VMS was a major comment of the VMS responde respondents. This is now in progress and VAC will be a supplement to the VMS,.[11/]

SUMMARY AND CONCLUSIONS

A problem of the methodologies of the management classes is that the higher scenic landscapes tend to receive the higher levels of protection. Protection of common landscapes may be just as important as the high scenic quality landscapes. It can he argued that the protection of common landscapes serves to enhance and heighten the scenic quality of the unique or precious areas.

It should be understood that high scenic quality can exist in unfashionable or inaccessible deserts and plains as well as in popular and accessible areas of craggy peaks, pine trees, and crystal clear lakes. It is only reasonable that each physiographic region be attributed with a full range of potential scenic quality. Since the visual landscape character varies from region to region, the scenic quality landscape features weight and ranges should be adjusted. Public attitudes, and accessibility also vary within regions and over time which is cause for the sensitivity level criteria to be adjusted and tested in each region.

Other problems exist in VMS and VRIEP/UVRIE that are inherent in inventory and analysis methodologies. Random as well as systematic errors occur in application of methodology. By educating the users to the complexity of the systems, these errors can eventually be controlled.[12/]

Improvements in the methodologies should be made as more research is available. The existing areas that the systems have been applied to should be periodically updated for continuing relevant management decisions. Public attitudes may critically affect the existing data in a relatively short time. The methodologies should be kept as simple as possible without sacrificing a complete approach.

We can ask, "Should the systems have been invented?" Because of the size and extent of USFS and BLM, a manual on visual resource management is necessary. Visual resource analysis provides the land manager with an understanding by sharpening one's sense of awareness and thus encouraging better decision in planning and management.

The systems do provide an integrative basis for collaborating land managers to act in concert while also enhancing accountability to the public. VMS and VRIEP should be considered a positive pioneering step in managing the visual resource.

In the future, public agencies can become more systematic and sensitive to the importance of visual resource and the effects of the visual resource policies and management on the feelings and actions of the public.

A committee, agency, or institution needs to coordinate a national visual management system, research, and information at all levels of government if we are going to manage our landscape's visual resource.

[10/] Iverson, Wayne D. 1975. Visual absorption capability. (rough draft). United States Department of Agriculture, Forest Service, California Region, San Francisco. (Mimeographed.)

[11/] Iverson, Wayne D. 1977. Letter to Blaise Grden. San Francisco, California, 21 March.

[12/] Becker, Carlisle. 1977. Assistant Professor of Landscape Architecture, Utah State University, Logan, Utah. Personal interview, October.

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