

# A System to Program Projects to Meet Visual Quality Objectives<sup>1</sup>

Fred L. Henley and Frank L. Hunsaker <sup>2/</sup>

**Abstract:** The U. S. Forest Service has established Visual Quality Objectives for National Forest lands and determined a method to ascertain the Visual Absorption Capability of those lands. Combining the two mapping inventories has allowed the Forest Service to retain the visual quality while managing natural resources.

The management of lands to meet or retain visual quality appears to most as a collection of conflicting words and methods. However, if one analyzes it the following thoughts emerge: Timber harvest entails the removal of a part of the landscape (fig. 1); to retain implies to hold or restrain (fig. 2); a landscape just by the natural order of things is continually changing due to natural germination, growth, and death (fig. 3). Thus, combining the natural succession process with carefully introduced management we have the opportunity to retain the character which gives a landscape its visual quality.

The U. S. Forest Service is charged by the public through Congressional acts and laws to remove timber and yet maintain the visual qualities of National Forest lands. This charge, although probably implied or assumed



Figure 1--An example of an area where timber has been removed.

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<sup>2/</sup>ASLA, Visual Staff Officer, Mt. Baker-Snoqualmie National Forest, Seattle, Washington; ASLA, Landscape Architect, Hells Canyon National Recreation Area, Wallowa-Whitman National Forest, Baker, Oregon.



Figure 2--An example of a landscape where visual quality has been retained.

by the public, was not fully met and led to controversy in the 1960's and is still somewhat of an issue-- Clearcutting controversies (fig. 4).



Figure 3--An example of natural attrition.



Figure 4--A more glaring example of an inappropriate clearcut on a sensitive landscape.

The National Environmental Policy Act (NEPA) of 1969 required all Federal agencies to manage and perpetuate scenic environments, among other things. It also required Federal agencies to develop methods and procedures to evaluate heretofore non-quantifiable elements, such as aesthetics.

The requirements of NEPA and the chance to continue timber harvest while retaining visual quality led to the development of the Visual Management System by the Forest Services.

This Visual Management System is based upon studies of landscape analysis that had been conducted in Scotland and Europe and were being explored by leading universities in the eastern United States, such as Harvard and the University of Massachusetts. The system is based upon data that have traditionally or historically been proven valid. The basis of

the system is that all landscapes are identifiable and describable in objective terms. This type of work has been done in the past by geologists, ecologists and hydrologists and has been accepted. The basis of the Visual Management System is the geologic or geomorphic formations which make up each geologic province. These geologic forms are combined with the vegetative cover, water bodies and water courses found within each province (fig. 5). This geologic, vegetative, and water combination province is then broken down into three categories based upon variety described in terms of form, line, color and texture. The form, line, color and texture elements come from the arts and have been proven over time to be the elements in art or in landscapes that affect the eye, with form being the most dominant and texture being the least dominant.



Figure 5--A vivid combination of land form, water body and vegetation.

The social importance of each landscape is then identified (fig. 6). This is done by determining (1) if the landscape is viewed by the public, (2) how many of the public view the landscape, and (3) how far the landscape



Figure 6--An example of social use of the landscape.

is from the viewer. The distance is rated in terms which again relate back to art. The method of presenting views through art has always been based and upheld historically in terms of foreground, middleground and background. In the physical landscape, the foreground extends from zero to one-half mile, the middleground from one-half mile to five miles, and the background from five miles to infinity.

After the social importance of the landscape is determined, then the variety of the landscape is compared to it and the amount of variety that could be manipulated is determined and described (figs. 7, and 8). The amount of manipulation is described in terms of retention of the variety, partial retention, modification or maximum modification of the

|               |   | Sensitivity Level |    |    |    |    |    |    |  |
|---------------|---|-------------------|----|----|----|----|----|----|--|
|               |   | F1                | M1 | B1 | F2 | M2 | B2 | 3  |  |
| Variety Class | A | R                 | R  | R  | PR | PR | PR | PR |  |
|               | B | R                 | PR | PR | PR | M  | M  | M* |  |
|               | C | PR                | PR | M  | M  | M  | MM | MM |  |

\*if a 3B area is adjacent to a RETENTION or PARTIAL RETENTION visual quality objective

Figure 7--A matrix combining variety class and sensitivity level to yield management objectives.

|                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------|
| <b>Visual quality objective (VQO)</b> Determine various degrees of acceptable alteration of the natural-appearing landscape. |
| <b>PRESERVATION (P)</b> Classified areas such as Wilderness.                                                                 |
| <b>RETENTION (R)</b> Management activities are allowed, but not evident.                                                     |
| <b>PARTIAL RETENTION (PR)</b> Management activities may be evident, but not dominate the landscape.                          |
| <b>MODIFICATION (M)</b> Management activities may dominate, should appear natural.                                           |
| <b>MAXIMUM MODIFICATION (MM)</b> Management activities may dominate, should appear natural as background.                    |

Figure 8--Specification of visual quality objectives.

variety. Contrary to what comes to most people's minds, maximum modification does not mean total manipulation. Rather, it means that man's manipulation of the landscape may be visible, identifiable, may dominate the landscape, but should borrow from the forms, lines, colors, and textures occurring naturally in the landscape.

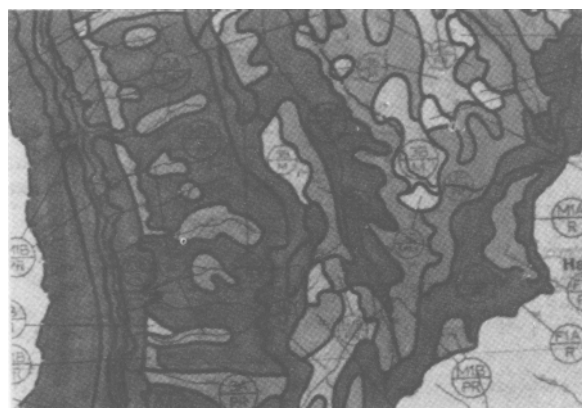


Figure 9--Geographic portrayal of visual quality objectives on maps.

All National Forest lands in Washington and Oregon have been identified and described with amounts of variety, and social importance determined, and visual quality objectives set. Each of the landscape factors combined with the visual quality have been mapped, graphically portrayed, and provided to each National Forest (fig. 9).

By having a geographic-vegetative zone or province as the base of a landscape inventory, we are able to recognize that the landscape flows beyond the man-imposed or administrative boundary of any one National Forest. Adjoining forests utilize the same description for the province, insuring that visual objectives relate to the same variety of elements. Thus, continuity of management should result within all visible landscapes.

However, a map showing landscape character, social importance, and visual quality (fig. 9), even when applied by a landscape architect, does not allow a land manager to estimate difficulties or cost of timber harvest while retaining visual quality. Recognizing this, the Forest Service is now refining the Visual Resource Inventory. This is being done by identifying landscape physical factors that affect the ability of that landscape to absorb man, his machines and influences. Here again, we go back to tried and tested data and factors that relate to geometry, art and physics.

For example, in geometry we learn that the closer a plane is to being perpendicular to us the more of the plane will be seen. In a landscape, the steeper the slope, the more man's manipulation or management will be visible. Another factor is that adjacent contrasting colors stop the eye. Thus, a very light sub-soil, exposed through construction and adjacent to dark surface soil, attracts and stops eye movement. Dense vegetation screens and stops eye movement. Dense vegetation screens

views, but open sparse vegetation allows relatively unrestricted views.

Combining physical and identifiable characteristics, such as those above, allows us to determine the ability of a landscape to absorb man's activities and management. This is known as the Visual Absorption Capability, or VAC, of the landscape. The lower the VAC, the greater the difficulty and cost of achieving the visual quality.

By now you recognize that to do a complete VAC analysis requires a great deal of detailed information. Applying this to a massive land base requires large expenditures of manpower and money, neither of which is available in vast quantities. To overcome this, the Forest Service is working on smaller selected land areas. These usually are corridors formed by roads, streams, or major trails. However, the eye does not stop at arbitrary administrative boundaries as it travels over a view. Thus the corridor must include all of the viewed lands referred to as the viewshed.

To understand how these systems, Visual Resource Inventory and VAC really work we need to look at a specific project such as the Nooksack River viewshed, located in the Washington Cascades within the Glacier Ranger District, Mt. Baker-Snoqualmie National Forest.

The Nooksack River, the northernmost river in northwest Washington, winds its way through a heavily timbered forest on its way to the Pacific Ocean via the Puget Sound (fig. 10). Several large glaciers and permanent



Figure 10--The Nooksack River valley.

snowfields are the primary source for the Nooksack and its tributaries. Elevations within the viewshed range from 950 feet to

over 10,000 feet (figs. 11\* and 12\*). The valley floor varies from a few-hundred-feet wide to approximately one-mile wide. From the edges of the drainage floor the mountain slopes rise abruptly to the north, vary in the steepness of slope to the south, and are dissected by many drainages (fig. 13).

The recreating public spends approximately 2,642,000 hours of 220,000 visitor days annually in this drainage--sightseeing, skiing, playing in the snow, camping, backpacking, mountain climbing, hunting, fishing, and gaining access to the North Cascade National Park which lies adjacent to the viewshed to the east (fig. 14, 15, and 16). Bellingham, Washington, located



Figure 13--An example of one of the dissecting drainages.



Figure 14--Lowland camping in the North Cascade

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\*See color illustration on page 395.



Figure 15--Alpine camping in the Park.



Figure 16--Winter sports activity in the Park

on Puget Sound, is 34 miles west of the National Forest boundary.

Most of the timber within the Nooksack drainage reached maturity many years ago (fig. 17). Since that time the condition of the timber has deteriorated, much of it to a state of being unattractive. Some of the older stands are being replaced naturally by a new stand of trees.

Because of the extreme sensitivity, a result of the numerous admiring visitors, very little timber has been cut. Where it has been harvested, mostly by regeneration clearcutting, the harvest is highly visible. The public has been very critical in regards to clearcutting in this viewshed.

Each National Forest District upon which commercial timber grows is required to harvest a certain volume of timber annually, based on

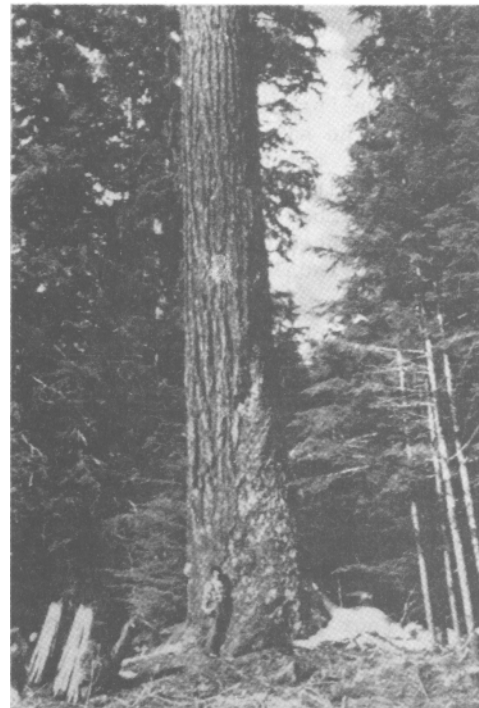


Figure 17--Old age timber within the Nooksack drainage.

the biological potential of the timbered portions of the District. In 1972 all National Forest lands, which at that time were not roaded, were identified and closed to any management which would result in altering the appearance of that land. Again in 1977, the unroaded land areas were reevaluated and more areas were added to be evaluated under the RARE II process.

The land with available timber on it became very scarce because (1) in the past most of the more gentle slopes were harvested, and (2) lands evaluated as non-roaded were excluded from timber harvest. Much of the Nooksack drainage was also involved in being closed to entry. However, in this drainage, acres of land available to timber harvest were greater than in any other drainage on the Glacier Ranger District.

The Visual Management goal is to retain the natural character of the land while managing for timber, other National Forest commodities and activities.

A viewshed study was suggested for the Nooksack drainage. The objectives of the study were to identify available timber and its ease of harvesting and retain the visual quality sought after by the public.

The Forest Service had already conducted

a visual inventory which established Visual Quality Objectives. The Visual Quality Objectives were being adhered to as closely as possible by the forest managers, but were threatened by the situation at hand. It was recognized that, through the process of the Viewshed Study with the above mentioned objectives, (1) timber could be programmed for harvest and replaced with a vigorously growing stand, and (2) visual quality could be maintained.

The visual inventory indicated that any management activity, such as timber harvest or road building, must either retain or partially retain the natural landscape. It was determined that the best way to recognize those areas having ease or difficulty of achieving the Visual Quality Objectives was by identifying key physical features of the land. These features, when identified, depicted the Visual Absorption Capability of that land. Four physical features were identified and mapped (fig. 18 and 19). They were (1) soil/vegetation color contrast, (2) soil stability, (3) suitability of soil to grow vegetation, and (4) steepness of slope. (It was recognized that dominant physical features may vary with climatic and geographic location; only those physical features having greatest impact upon the study objectives should be selected; and when four or five features are used, the task at hand becomes a mind boggling monster.)

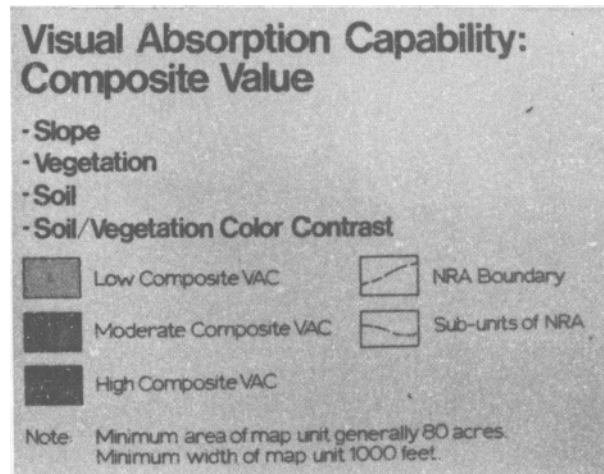


Figure 18--Visual absorption capability: composite value key.

By combining these physical features, three ranges of intensity were identified resulting in each landscape being classified as having either high, moderate, or low VAC (fig. 19).

As the drainage is viewed from the major travel routes and use areas, certain portions are screened from view by either land forms or masses of vegetation. The screened and visible portions of the corridor were mapped and then combined with the VAC map through the use of a matrix creating and identifying six degrees of sensitivity--three seen and three not seen (figs. 20, 21 and 22)

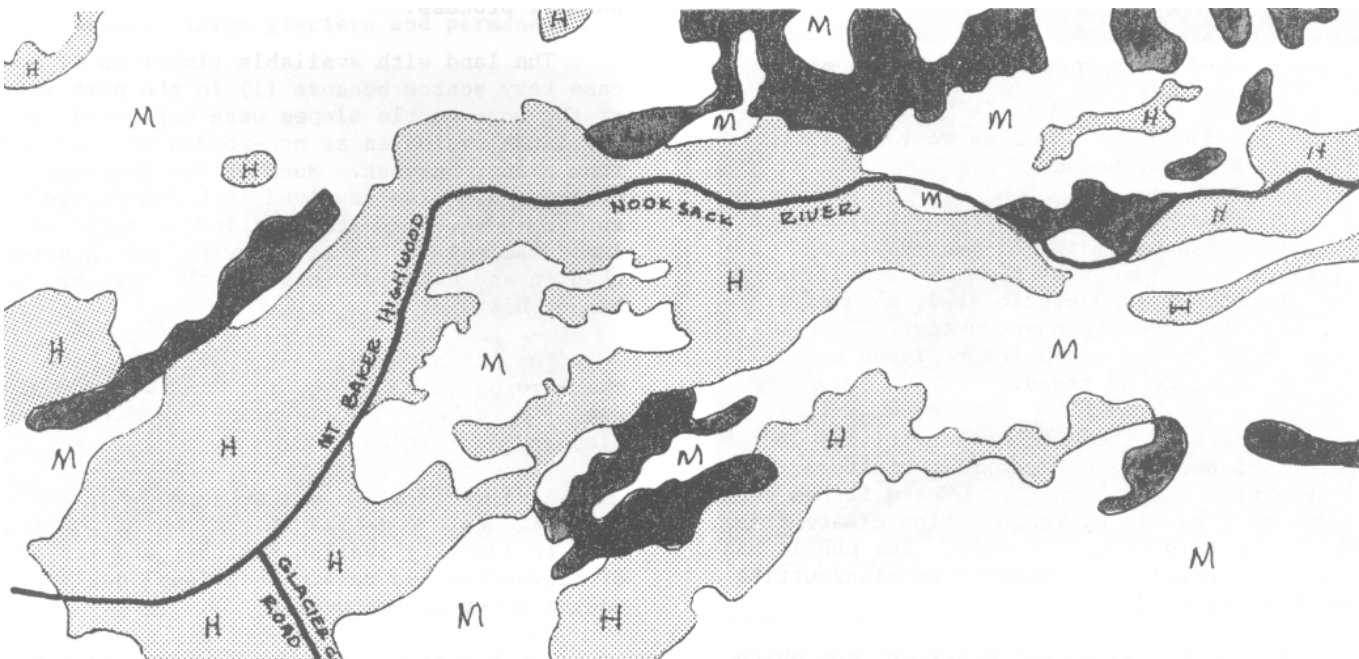


Figure 19--VAC - Visual Absorption Capability Map

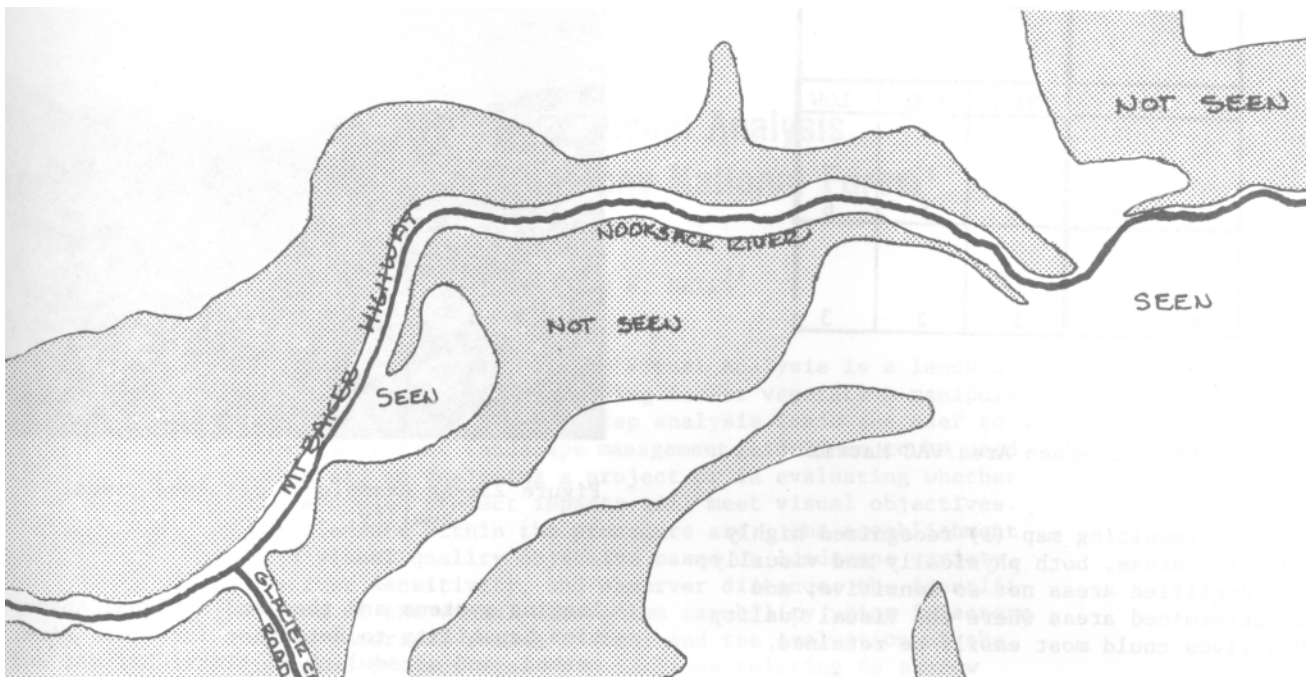


Figure 20--Seen - Not Seen Map



Figure 21--VAC - Seen Area Map Matrix

|          | VAC  |     |     |
|----------|------|-----|-----|
|          |      |     |     |
|          | HIGH | MOD | LOW |
| SEEN     | 4    | 5   | 6   |
| NOT SEEN | 1    | 2   | 3   |

Figure 22--Seen Area/VAC Matrix

The resulting map (1) recognized highly sensitive areas, both physically and visually; (2) identified areas not so sensitive; and (3) determined areas where the Visual Quality Objectives could most easily be retained.

With this accomplished we were able to begin planning for timber harvest and road location. The portions of the viewshed not seen and having a high Visual Absorption Capability lent themselves to regeneration clearcutting and road building. Those with moderate and low VAC which were not seen also lent themselves to regeneration clearcutting and road building, but with precautionary measures required to protect the land from resource damage. The portions of the drainage which were visible, and which had a high VAC, could be managed more intensely than those with moderate or low VAC.

Using this VAC and seen area data, the landscape architect, forester/silviculturist, logging system engineer and civil engineer can work as an interdisciplinary team to match visual objectives, silvicultural objectives,



Figure 23--An example of retained visual quality.

logging systems and the land's Visual Absorption Capability to determine location, size, method, and scheduling of timber harvest and roads to service the timber harvest activity while retaining visual quality (fig. 23).

#### LITERATURE CITED

- Fenneman, Nevin M.  
1931. Physiography of the western United States.
- USDA Forest Service  
1974. National Forest Landscape Management. Agric. Handb. 462, Vol 2, Chap 1.
- USDA Forest Service  
1977. Visual Absorption Capability. F.S. Manual No. 2383.2.