

SELECTIVE CUTTING of ROADSIDE VEGETATION for IMPROVED HIGHWAY SAFETY, APPEARANCE, and USE

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This paper describes briefly, and generally, the circumstances in which the selective cutting of roadside vegetation should be practiced for improved highway safety, appearance, and use. It is intended to be preliminary in the nature and depth of its coverage; to be only the beginning of an understanding of the subject. Some phases may have been overlooked and others only partially developed.

A discussion of the selective removal of vegetation from roadsides should revolve around two points of view, that of the driver of a car and that of his passenger. No attempt is made here to describe or explain the principles and interrelationships of philosophy, psychology, and human behavior as they relate to highway design and construction. These are subjects gaining in recognition and in application. It should be sufficient to state that the occupants of a vehicle generally are pleased with and grateful for the use of any principles or devices employed by highway and landscape engineers in the design and construction of a road that have made the task of driving safer and more pleasant, even though the driver and passenger may not be able to indicate or describe exactly what it is that has caused driving to be less of a chore.

The selective cutting and removal of vegetation from roadsides is one device that does improve the safety, appearance, and use of a highway.

On new roads, many safety features are being "built in." A feature such as adequate sight distance on curves and at intersections has become an accepted element of good design. It is highly desirable that the driver of any vehicle be able to see far enough ahead while rounding a curve or approaching an intersection to be able to bring his car to a full safe stop if required (Figs. 1, 2, and 3). No tree, shrub, or other object should obscure his vision. The physical dimensions of a desired sight distance can be computed with reasonable accuracy through the use of certain known and assumed factors. These factors—road curvature, gradient, and superelevation; vehicle speed and rate of deceleration; and stopping distance—have been published in Special Report 23, prepared last year for the Highway Research Board by a special subcommittee of the Committee on Roadside Development.

If the limitations of a sight-distance zone result in an uninterrupted and uninteresting planting outline, it is possible to justify the use of a few plants within the restricted zone in order to soften the outline. These plants should be scattered and few in number. Existing trees permitted to remain should be high-headed; their presence may cause no real sight restriction until their trunks become large. In any instance, the use of grass or low ground-cover plants should be encouraged. The application of the formulas for determining sight-distance zones has proved that, within the limitations of the formula, adequate sight distance as well as a satisfactory planting design may be achieved.

It should be obvious how important it is to keep road shoulders and drainage-ways free of trees and shrubs at all times, not only for reasons of safety but also



Figure 1. Before (upper photo) and after (lower photo) selective thinning of vegetation to improve sight distance around curve and at intersection in mountainous area on Blue Ridge Parkway, Va. Lower photo is a closed vista of a shrub bay.

density of growth often great. To allow nature to continue an undirected and uninterrupted development on cut and fill slopes often is a mistake. Eventually, the material attains such size and volume that it offends the principles and requirements of safety and good appearance. The offending plants must be removed, trimmed, or otherwise controlled and managed in order to reestablish these principles and requirements (Figs. 4 and 5).

There are occasions when it is necessary to remove or to trim trees and shrubs along a roadside in order to permit the unhindered passage of telephone, light, and power lines. In the hands of experts, the required removal, pruning, or trimming of plants for utility clearance may be done so skillfully that the altered appear-

for reduced maintenance and improved appearance and operation. Shoulders are intended primarily for the emergency or incidental use of vehicles. The presence of trees and shrubs reduces the area available for this purpose, lessens the value of the shoulder as a safety device, detracts from its appearance, and increases the cost of maintenance. The presence of trees and shrubs in ditches and gutters could retard the free flow of runoff water and other material and result in a clogged drainageway and flooded roadway, could permit greater and uncontrolled percolation under the drainageway and result in saturation and failure of a road base and fill, could present an unsightly appearance, and could increase the cost of repair and maintenance.

At the completion of the "heavy" work of a road building project, the cut and fill slopes usually are devoid of vegetation unless the presence of an unusual tree or shrub, or groups of them, warrants their preservation and circumstances are such that their retention is feasible. If left unmanaged, these slopes would generate a vegetative cover in due course. However, the raw material of the slopes, reflecting an unnatural condition created by man, is not conducive to the growth of plant material that is considered desirable or proper for the best development and use of a traffic facility. Trees and shrubs that "volunteer" may create an unnatural vegetational condition; their rate of growth is usually rapid, and their

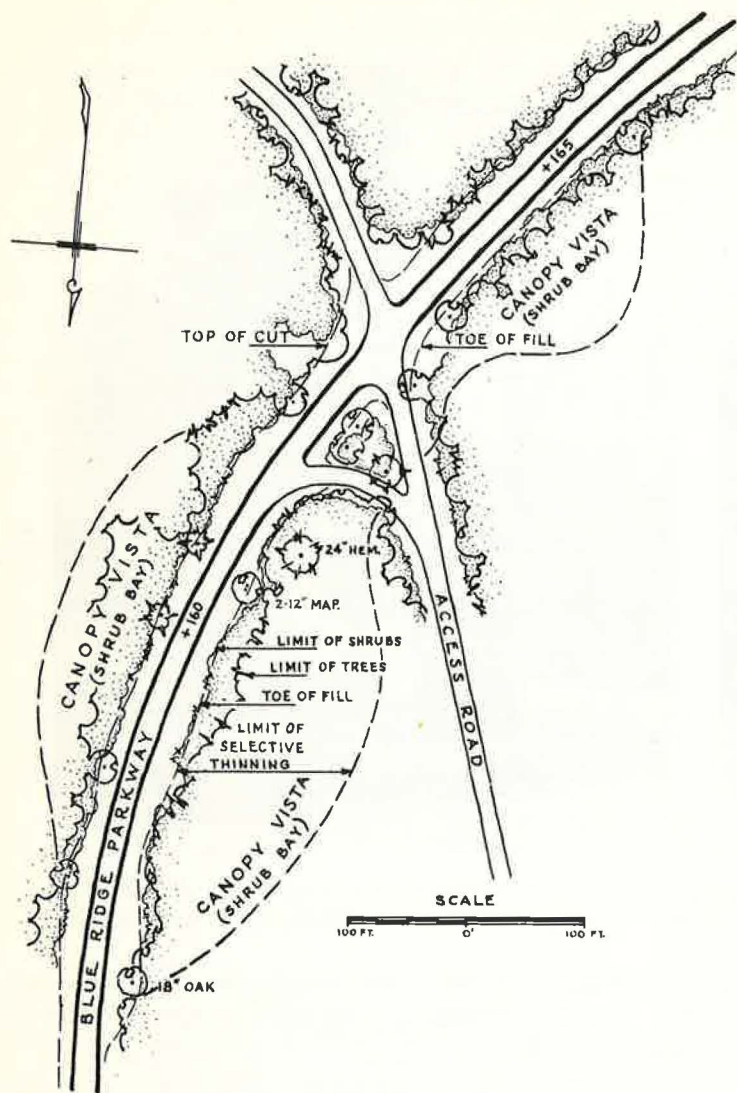


Figure 2. Portion of land use plan for Blue Ridge Parkway (see Figure 1).

basis. Trees that are not expected to reach a dangerous height within this period need not be removed.

Today's highway is more than just a facility designed to move cars, commerce, and people quickly from one place to another. It has other purposes. It endeavors to make that trip from "here to there" as safe, as restful, as diversified, and as interesting as possible. It encourages the motorist to use the road for reasons other than simply travel by adding such features as parking turnouts, rest areas, and wayside parks. It calls attention to historic events and to natural or other phenomena by means of wayside signs, exhibits, or museums. It develops interest in its alignment by merging with the forest and desert, by blending with the meadow and fields, and by creating vistas to points of interest or areas of special attraction.

Whenever and wherever the characteristics of a roadside indicate the desirability of constructing special devices or creating special effects, the treatment of plant materials becomes an important consideration. The landscape and planting de-

ance of the plants is not unnatural and is scarcely noticed. Done by the novice or the careless, the results may be grotesque. In all instances where a utility line is located close to a road, either paralleling it or crossing it, overhead or underground, the removal or thinning of trees and shrubs within the easement of the utility line can follow a definite and desirable pattern. Enough vegetation should be removed near the center of the easement to permit the free and clear passage of the lines and the progress of maintenance personnel and equipment. The passageway from pole to pole or tower to tower need not necessarily be a straight line; it may be somewhat indirect because of topography and ease of access.

Clearing operations, particularly on slopes, should be conducted in a manner that will avoid erosion. A turf or low ground cover should be maintained over the entire central area of the clearing. From the central area outward to the limit of the easement, the selective removal of trees and shrubs should be progressively less, so that a transition is developed from the heavy clearing in the center to the limited clearing at the edge. All trees that could foul the conductors in falling should be removed. Maintenance should be provided on a three- to four-year



Figure 3. Before (left) and after (right) selective removal of vegetation to improve sight distance at rural intersection. (Maryland State Roads Commission.)

sign of each subject should be determined according to its own requirements. It may mean the selective removal of relatively few plants within a confined space or the almost mass removal of many plants over a large area.



Figure 4. Dense growth of young evergreen trees on fill slope will eventually require thinning.



Figure 5. Young pines on fill slope on curve are reducing sight distance and closing vista of meadow.

Whenever and wherever circumstances warrant the removal of trees and shrubs to create vistas of distant scenes or views of a closer, more special nature, along a roadside or a roadside public-use area, the degree of artificial management or control of vegetation seems to follow certain prescribed conditions and patterns.

For the sake of brevity, the creation of any roadside picture or composition through the removal of vegetation may be called a "vista," regardless of its size or other circumstances.

Vistas are developed with two points of view in mind. They may be the "stationary" kind; that is, the kind seen from a parked car or from the described limits of a parking turnout, rest area, or wayside park; or they may be the "moving" kind, the kind seen from the windows of a vehicle still moving forward on a highway (Figs. 6 and 7).

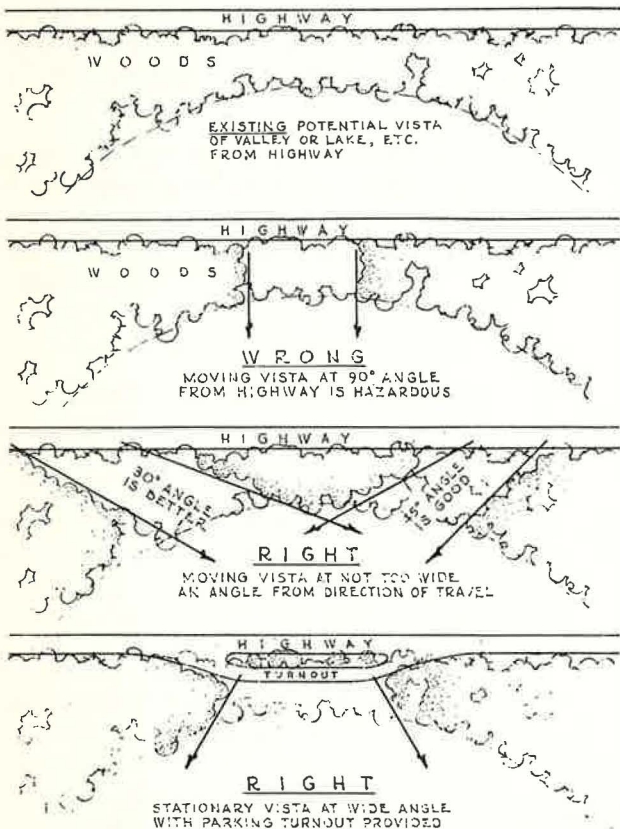


Figure 6.

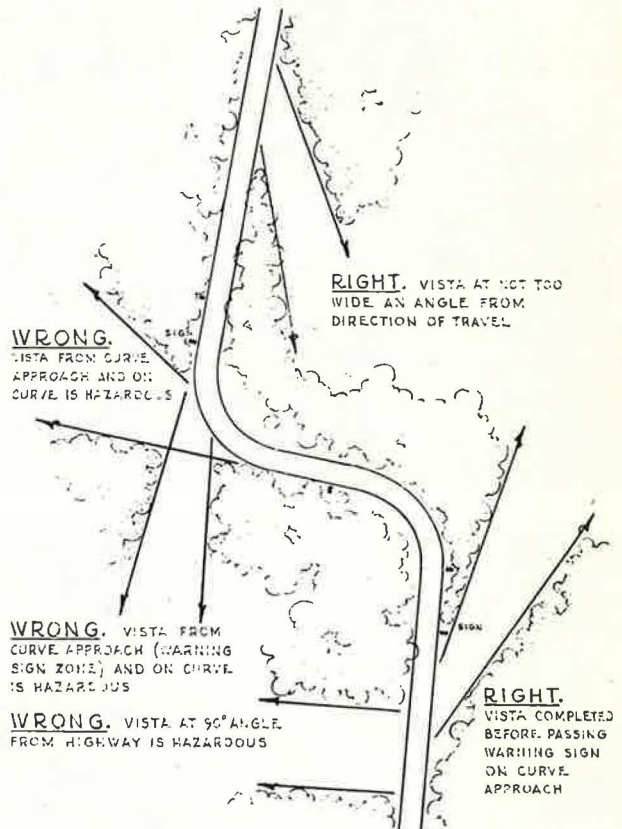


Figure 7.

The extent of vegetative clearing to be done for either a stationary or moving vista depends to some degree on the consideration of a time-space relationship that exists between the scene or object to be viewed and the person doing the viewing. Generally, the clearing required for a stationary vista is quite selective and conservative because the observer has more time to see and to study the scenes or objects called to his attention. If a vista is created at a moving location, the amount of time and space planned for should relate directly to the vehicle driver's viewpoint. No moving vista should be located on a curve, at the end of a tangent leading into a curve, or at right angles to tangents. Vistas on tangents should be

developed at a forward angle from the direction of travel.

The subject of the vista should be relatively simple so that the observer, catching a glimpse of something rare and unusual within the frame of the foliage, may remember pleasure from the "flash" picture long after he has moved past it (Fig. 8). Clearing for such vistas never need to be more than a few hundred feet in length. If the nature of the vista suggests that it should be cleared for more than several hundred continuous feet of its length, then it has passed beyond consideration as a moving vista and should be considered a stationary vista, with a parking turnout or other stopping place provided.

Clearing for vistas also depends to some extent on the nature of existing vegetation and the direction of prevailing winds. In the interest of forest protection, the cutting of vistas should be undertaken with great care. The susceptibility of trees to windthrowing varies considerably with the species of tree, the age and condition of the forest stand, and with topographic and other site conditions (Fig. 9).



Figure 8. Before (upper) and after (lower) selective cutting for angled "flash" vista along Merced River, Yosemite National Park, California.

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The manner of selectively removing vegetation for vistas appears to result in three general types of vistas, insofar as the pattern of clearing is concerned. These types may be considered to be "open," "closed," and "canopy" vistas (Fig. 10).

An open vista is one where the vision extends, generally without interruption, to the horizon and to the lateral, or right and left, limits of a clearing. It usually favors a panorama of some distant scene, such as a valley, mountain, lake, or open countryside (Fig. 11).

A closed vista is one where the vision is restricted or confined to a generally small area by a vegetative barrier. Such a vista may afford an intimate or singular glimpse of a specific scenic attraction or other natural phenomena, a historic structure, or perhaps a stand of shrubs, a waterfall, or a rock formation (see Fig. 1).

A canopy vista may be either an open or closed vista that is framed overhead by trees close to the road or the observer. The line of vision is through and under the trees and may be extended or constricted as circumstances indicate: Often the

WINDTHROW

Trees growing in exposed locations are adapted to strong winds. They should not be removed if they form a buffer area protecting trees that are less stable.

Susceptibility to windthrow varies according to species of tree (many conifers are shallow-rooted), age and condition of stand of trees, and topographic and other site factors.

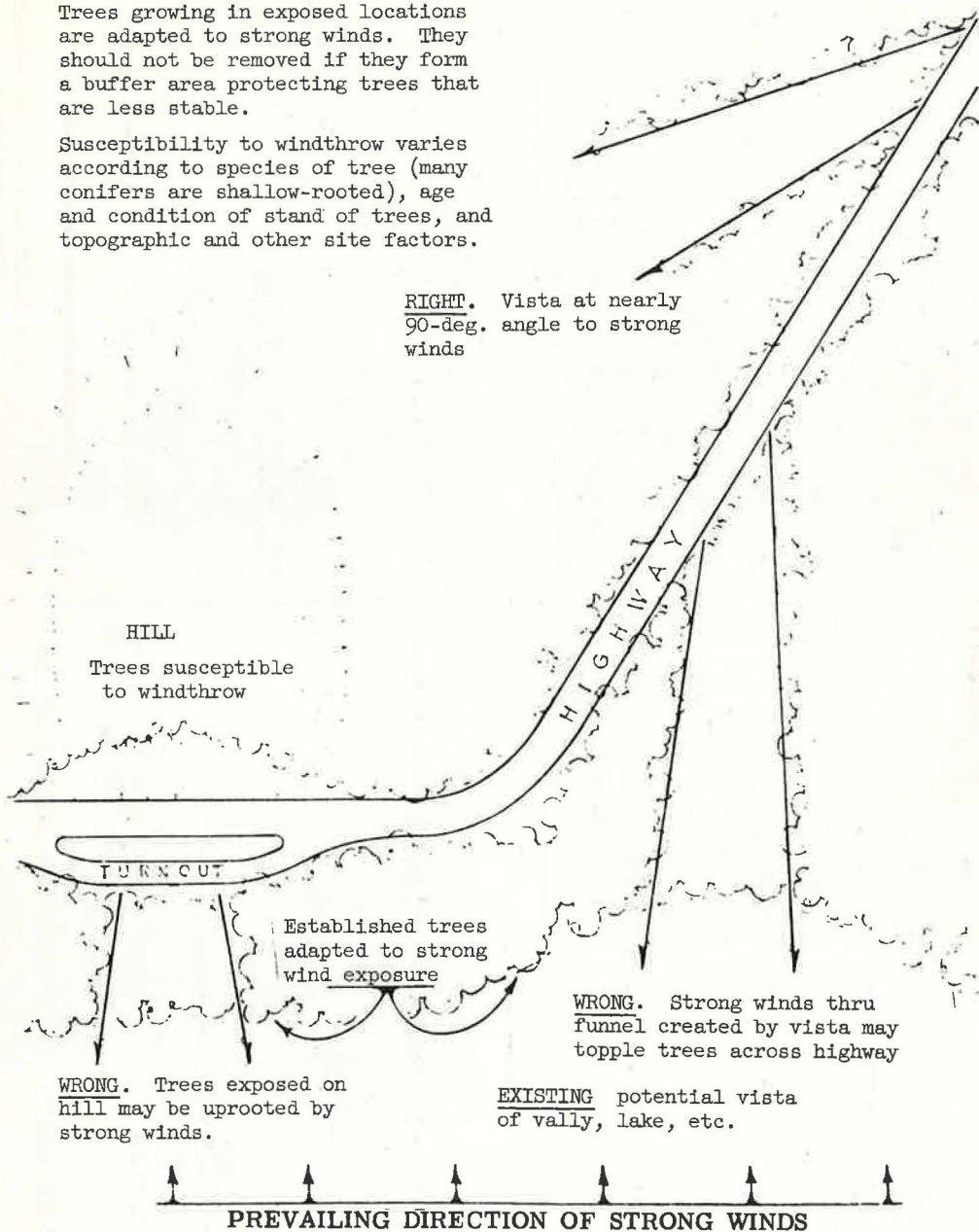
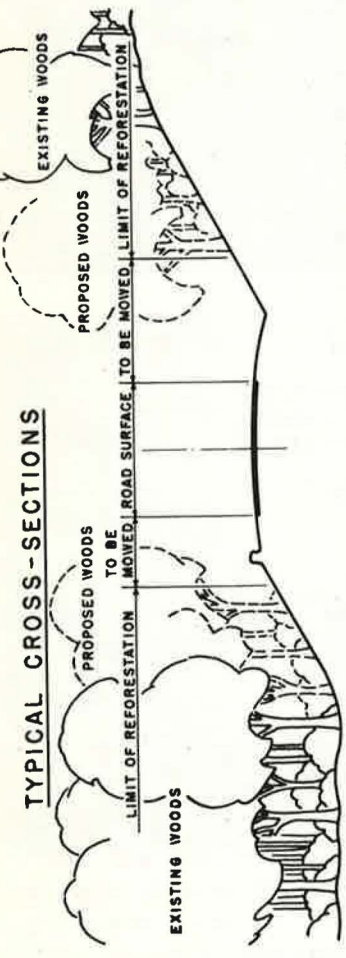
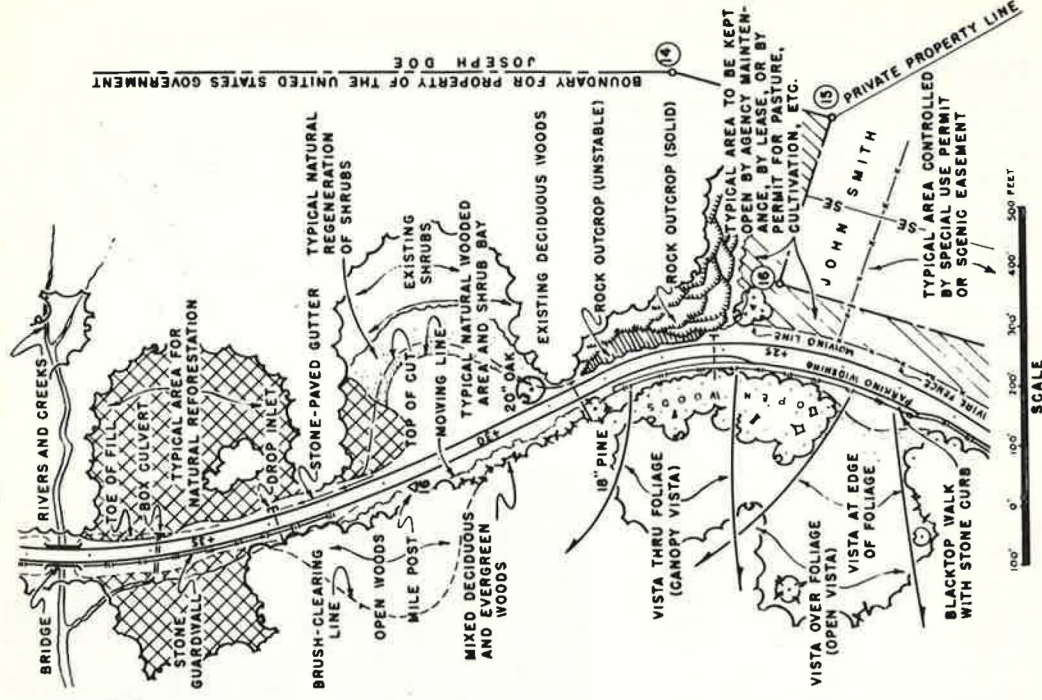


Figure 9.

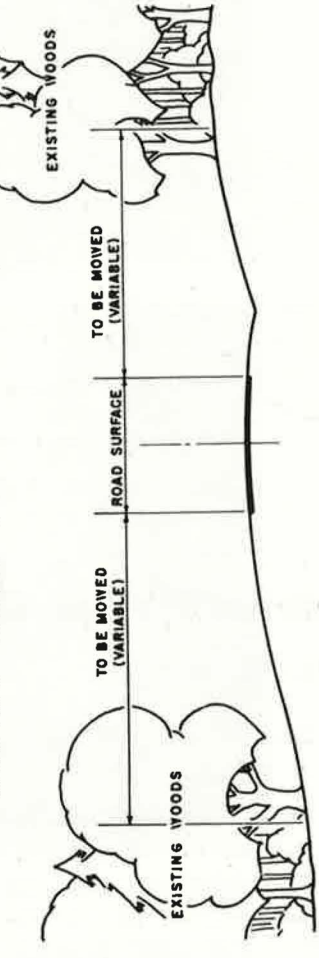
more attractive and less expensive of the vistas, it should be given special consideration (Fig. 12).

The information contained herein is incomplete—necessarily, it would seem. In years past, some selective cutting and maintenance projects have not had the good fortune of complete management. Some history has not been recorded, statistically or graphically, and this omission cannot be corrected. In this respect, there always will be gaps in the record. For some projects the story is complete and valuable. Other projects are in an active status, and data concerning progress

PLAN INTERPRETATION



MOWING LIMITS FOR REFORESTED AREAS



MOWING LIMITS FOR NATURAL WOODED AREAS & SHRUB BAYS



NOTE: TREE AND SHRUB AREAS TO BE THINNED AND CLEARED OF BRUSH PERIODICALLY TO KEEP VISTA LINES OPEN. BRUSH CLEARING LIMIT TO BE EDGE OF TREE LINE, UNLESS OTHERWISE SHOWN.

MOWING AND CUTTING LIMITS FOR VISTAS AND LEASED AREAS

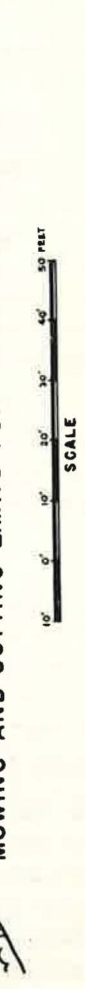


Figure 10.

U. S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
PORTION OF PROPOSED
ROADS AND TRAILS MAINTENANCE PLAN

will become available from time to time. Information that portrays the before, during, and after status of present selective cutting and maintenance operations will be of high value in providing a basis for the development of criteria, costs, and methods of procedure for future projects. In light of a growing awareness of the importance of the subject of roadside development in an expanding highway program, this report marks a showing of interest and information in one phase of the general subject—the selective cutting of roadside vegetation for improved highway safety, appearance, and use.



Figure 11. Site of an open vista before and after selective cutting to open up the view of Bridalveil Falls, Yosemite National Park, California.



Figure 12. Site of a canopy vista before and after selective cutting of "ledge" of small trees and shrubs. Skyline Drive, Shenandoah National Park, Virginia.

DISCUSSION

GARMHAUSEN: What was the effect of wind on the trees that were left after thinning the area as to "windblown" trees? (Reference to motion picture film, "Vista Clearing on Blue Ridge Parkway.")

DISQUE: Large trees that were considered for retention in the vista clearing plan were examined by the landscape architect and highway engineer, prior to the beginning of clearing operations, with regard to the condition of the trees, the nature of the root systems, the nature of the soil, moisture and drainage conditions,

etc. Those trees determined able to withstand windthrowing were retained; others were removed in accordance with the plan. I can recall no instance when a tree thus retained has later fallen due to windthrowing or slope erosion.

DEAKIN: Was it necessary to spray a second time in order to keep down volunteer plant growth? (Reference to motion picture film, "Vista Clearing on Blue Ridge Parkway.")

DISQUE: A second spraying of the herbicide 2,4,5-T was used on the two vista sites shown in the film. This was, in part, because the cutting was done so late in the fall that a few species of plants had fruited and dropped seed. A second spraying the following spring destroyed the seedlings.