PACIFIC SOUTHWEST Forest and Range Experiment Station

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LANDSCAPE CONTROL POINTS: a procedure for predicting and monitoring visual impacts

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Generalizations about esthetics and protection of "natural beauty" are of small help to the land manager. He needs some way to anticipate the visual impacts of management alternatives, some way of assessing the sensitivity of the landscape as it may be affected by possible alterations. In planning for multiple use of the land, he needs a procedure that can accommodate the different perceptions of changes in the landscape that are inherent in various disciplines.

An approach that may be helpful is to use a network of Landscape Control Points (LCP)–backed up by plots of visible areas shown on topographic maps, panoramic photographs, sketches, and overlays. The network has two purposes: (a) to emphasize the landscape as a scenic resource; and (b) to contribute to more effective control of change through an orderly process of direct field review. This approach can help the land manager visualize alternatives and enable him to choose those most fitting in a given situation.

An individual LCP is a fixed station from which a broad, intermediately distant view of the landscape may be seen. In an earlier report, I described three locations of the observer as he looks upon a visual objective: "observer inferior"–if he is below it, "observer normal"–if he is at the same level, and "observer superior"–if he is above it (Litton 1968, p. 5-10).

In *figure 1,* the observer is in a "normal" position and the distance is that of the "middle ground," defined as a distance range of one-half to 5 miles or more to the ridge (Litton 1968, p. 3-4). Other observer positions ("inferior or superior") would do as well just so long as there is an unobstructed view of the landscape's main structure–its form and space. Variables in the objectives' size and shape, color brilliance, and atmospheric and light conditions make it difficult and misleading to give set distance limitations. In another example *(fig. 2)*, a square selective cut, ½ mile by ½ mile, is readily visible–yet subtle–at a distance of 9 miles. Arbitrary rules for fixing point locations or defining view characteristics cannot substitute judgment to be exercised in specific regions and places.

This paper outlines a five-step procedure for locating and using Landscape Control Points to study landscape and the visual impacts of alterations, describes the criteria for locating such points, explains three different ways of plotting the visible landscape, and offers a case study of how the procedure was applied on the Teton National Forest in Wyoming.

FIVE-STEP PROCEDURE

Establish Landscape Control Points

- *Step 1:* Establish a network of LCPs to give a reasonably continuous view of an extended area.

As an example, a set of viewing stations along the highways and roads of a National Forest provides a visual sampling of that Forest. The landscape seen would be but a small part of the Forest's total area, but it would represent a significant image most readily available to the public. Ideally, the LCPs should overlap with one another so the comprehensiveness of a continuous visual corridor is developed. It is also desirable for LCPs to give different views of the same landscape segment–especially for segments judged to be scenically significant or more vulnerable to impacts of use than others.

A network could also be built upon other means of coverage, such as using points on a grid system or selecting good viewing points from topographic maps and stereoscopic air photos.

Plot Visible Landscape

- *Step 2:* Plot on a topographic map the limits of the visible area seen from each LCP.

This plotting can be done in the field by translating observed visual boundaries into lines on a map. The areas seen from each viewing station are joined together so that a generally continuous plot of visibility is obtained. At the same time, what can be seen from each LCP can be identified.

Several more refined methods of determining the limits of visual areas and their map location are also possible: (a) the use of hand-drawn sections devel-

Figure 1–View of an intermediately distance landscape from a Landscape Control Point. The observer is in a "normal position," seeing the object at the same level. (Pat O'Hara Mountain, Park County, Wyoming)

Figure 2–Square selective cut, one-half mile square, on private land in the Hayfork Ranger District, Shasta-Trinity National Forests, California. The observer can see a distance of 9 miles.

oped as rays from a Landscape Control Point; and (b) application of the VIEWIT computer mapping technique (Amidon and Elsner 1968). Both of these techniques have certain advantages of convenience and accuracy compared to field plotting. Working in the field does, however, provide the additional opportunity for making qualitative observations about the particular landscapes involved. A combination and balance between field and office methods of plotting should be the goal.

Photograph Panoramic View

- *Step 3:* Photograph a panoramic view from each of the LCPs, selecting a suitable time of day and season for each situation.

Replication of the same view at different seasons of the year will be needed to represent changing emphasis in the way the landscape looks. The photographic view serves as a general record taken from a specific station at a specific time. It will also be useful as a base for sketch overlays which result from studies of various project proposals. As a guide to recording the photo data, see the publication by Magill and Twiss (1965).

Equipment such as 2¼- by 2¼-inch twin lens reflex camera mounted on a pan head with level bubble will produce both good normal photographs (about 45° angle of view) from single negatives as well as broad view panoramic mosaics from a set of negatives. More specialized cameras, such as the Widelux (Panon Camera Shoko Co., Ltd.) or Panoram 120 (Burke & James, Inc.) produce wide angle views (140° and 120°, respectively) from a single negative. [1]

Prepare Perspective Sketches

- *Step 4:* For more specific parts of a broad photographic panorama, prepare perspective field sketches as a base for more precise or finer grained studies of possible changes and alternatives.

A sketch might well direct attention to the particularly sensitive landscape related to a feature, such as a dominant mountain peak or lake. Drawings of this kind do require a certain expertise, but they offer a means of concentrating upon major compositional aspects of the landscape while at the same time simplifying certain complexities associated with detail. In the realm of scientific art–not to be compared to "field sketches"–the remarkable Grand Canyon drawings of William Henry Holmes show how well the landscape may be interpreted through drawings (Dutton 1882) *(fig. 3).*

1 Trade names and commercial enterprises or products are mentioned solely for information. No endorsement by the U.S. Department of Agriculture is implied.

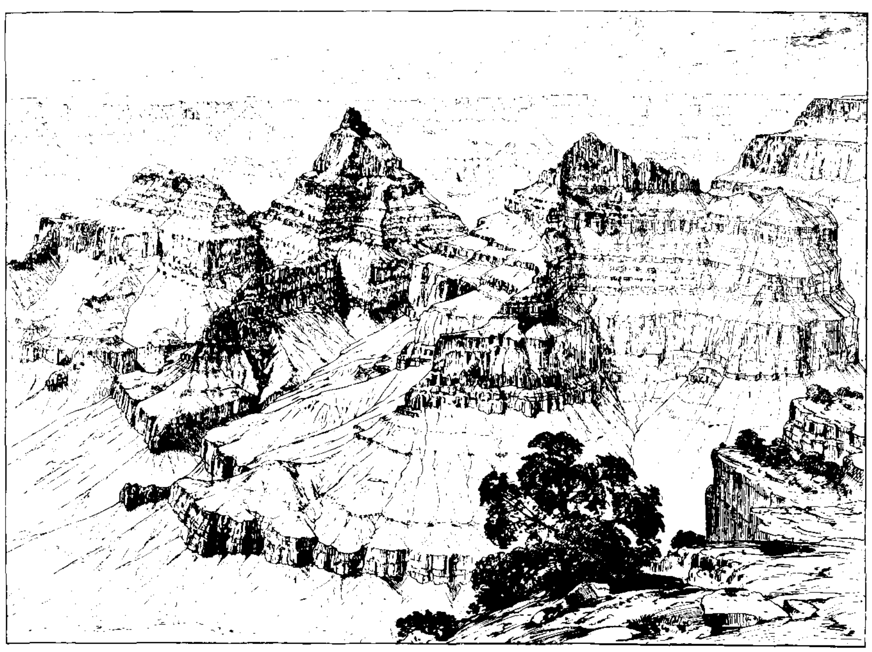


Figure 3–William Henry Holmes' drawings of the Grand Canyon in Arizona, titled "Vishnu's Temple," shows how well landscape can be interpreted trough this medium.

Project Impact of Change

- *Step 5:* As elements of a management plan or a Forest Service multiple-use plan are studied and proposed, use the Landscape Control Points and the graphic information derived from them to project the possible impacts of planned proposals.

While ideas for the physical change are still tentative, their consideration and discussion of implications might well take place on the ground at the pertinent LCPs. As plans change from ideas to specific alternatives of physical design, projected graphic versions may be prepared as overlays to the photographic record (Step 3) or overlays to the sketch record (Step 4). Then prepared visual displays may be considered on the ground, at the pertinent LCPs.

The results of carrying through to Step 5 should provide greater recognition that various resource management decisions carry seeds of different visual changes in the landscape. Not all professional disciplines are used to thinking in terms of visual end products. And the integration–in some degree–of the various inputs of different disciplines could be aided through this use of visual devices related to the landscape.

LOCATING LANDSCAPE CONTROL POINTS

Criteria for LCPs affecting their location and use involve relationships to: (a) roads and trails, air routes; (b) areas of congregation and concentrated use; (c) overviews covering landscapes of special value; (d) places and conditions offering best viewing opportunities; and (e) overlapping fields of view and different views of the same landscape segment.

Roads and Trails

Roads are more than a route between points; they are a viewing platform giving a visiting observer major impressions of a National Forest or other wildlands. The moving viewer can receive a complex set of images about the landscape that cannot be duplicated by the view from a single static point. Yet an individual LCP can represent, in some generality, a summary aspect from a particular section of road *(fig. 4).*

The type of road offers a clue as to relative importance of particular viewing points. A Federal highway, for example, is more critical than a local Forest system road because of larger traffic volume. Yet overviews from Federal or State highways within National Forests show no immunity from impacts of use that lie heavily on the land *(fig. 18).* So also with local roads. All roads have importance, however, in providing a comprehensive sense of a region and in demonstrating the visual aspects of resource management–whether compatible with the landscape or not.

The length of time a particular landscape can be seen from one or more segments of road (Atkinsen 1965) and the number of times that an objective area may be sighted (Elsner 1971) should both figure in the selection of LCPs *(figs. 7,8).*

Trails, because of pedestrian rate of travel and opportunity for concentration upon nearviews or de-

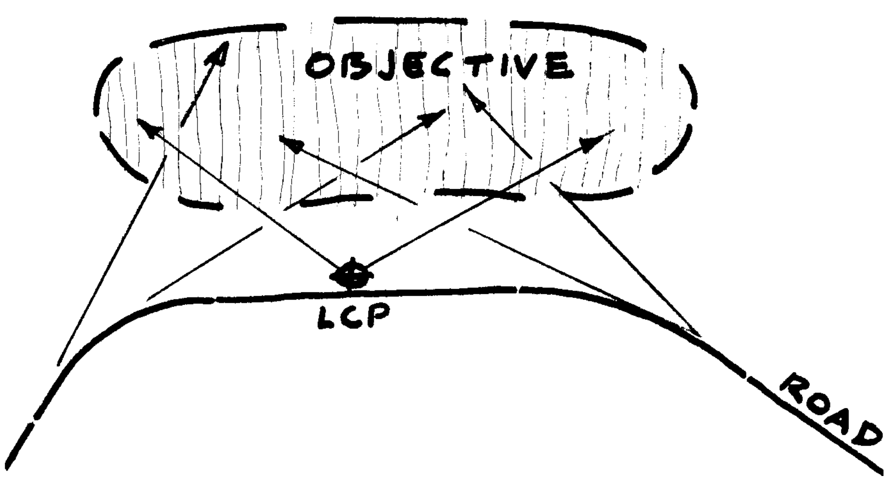


Figure 4–One Landscape Control Point can represent several views from a road or a section of it.

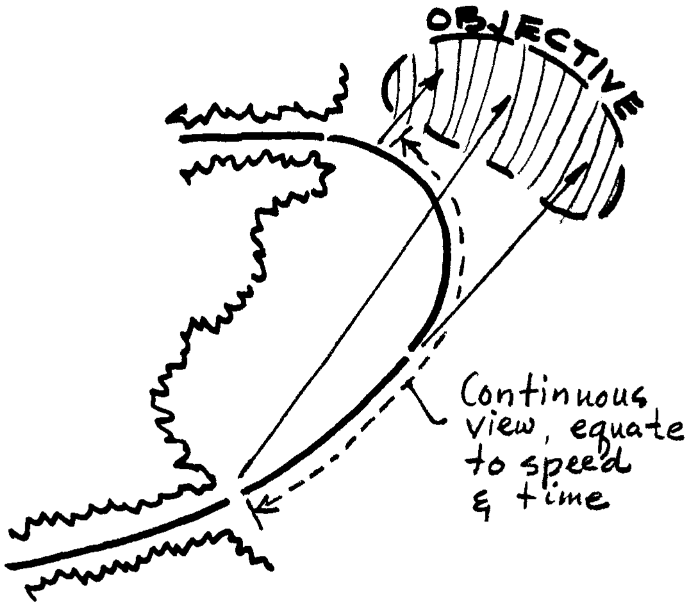


Figure 7–Continuous road viewing of one objective area.

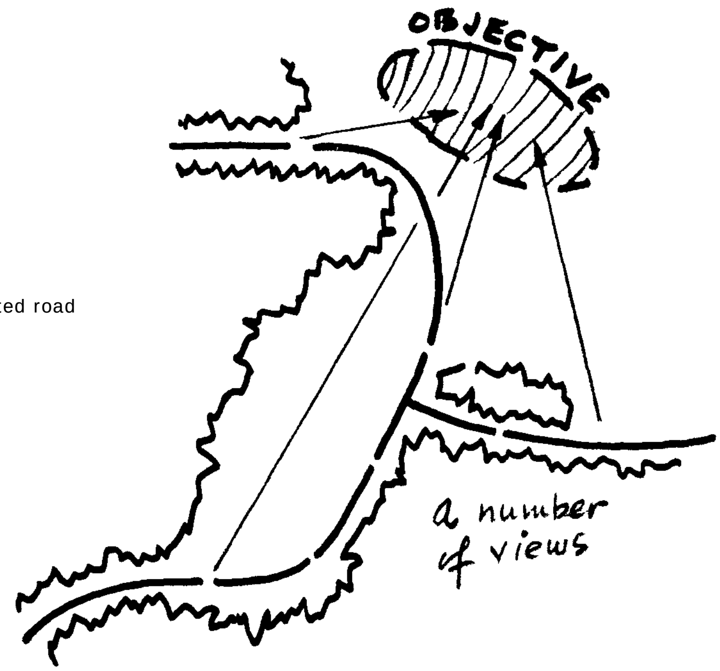


Figure 8–Intermittent and repeated road viewing of one objective area.

tail, are also important as the sites for viewing stations. A number of significant situations can be identified. Trailheads, where car travel stops and travel by slower means begins, represent a pedestrian concentration that may coincide with an important outview. Trails within Wilderness Areas–especially near forest boundaries–often include views into areas where timber cutting or road building are allowable. From such wild area points it must be assumed that sightseers will be especially sensitive to signs of manmade change that may be incompatible with the landscape (Lucas 1964). Thus it appears that trail LCPs from wilderness into the thresholds of wilderness serve a special purpose. Then, too, with trails representing slow travel and ease of stopping, vista points might well be used for longer periods of time and perhaps more critically than view points related to roads. LCPs associated with trails represent another link in the build-up of an over-all regional understanding.

The scope of this study has been limited to ground viewing. Visibility from air routes should also be taken into account and would add another measure of criticality. Techniques for visual monitoring by air have not been included here.

Areas of Concentrated Use

Congregation areas and points of concentrated or extended use indicate likely locations for LCPs. Scenic viewpoints or rest stops along roads are exam-

Figure 5–Panoramic landscape, a compositional type, as seen along a heavily traveled highway, on the Grand Mesa National Forest, Colorado.

Figure 6–Feature landscape, a composition type, as seen along a heavily used highway, near Challis, Idaho.

pies of short term viewer congregations–a number of these have been used in the case study. Recreational facilities, such as ski areas (base areas and lifts in particular) or swimming beaches, represent concentrations of users who will have extended stays and numerous opportunities to view their surroundings. Campgrounds, where recreationists may "live" for a few days or a few weeks, should be represented by LCP locations if significant outviews are obtainable. Areas which are privately held, where people live or where urbanization exists, should be recognized as sensitive to the visual impacts which may come within view (USDA Forest Service 1970); these need to be included as critical locations for LCPs. Urbanization which expands into new places also can enlarge the total area that can be seen.

Landscapes of Special Value

Landscapes that can be recognized for their special merits must be accounted for in locating LCPs. Scenic outlook points along a road, for example, tend to use "observer superior" or "observer normal" positions which typically offer a comprehensive overview of some one of four types of landscape compositions (Litton 1968, p. 23-35). These compositions are identified as panoramic, feature, enclosed, or focal landscapes *(figs. 5,6,9,10).* Each one may be looked upon as having particular kinds or zones of sensitivity where visual impacts of manipulation will be conspicuous. In these circumstances, the LCP enables the observer to have directed surveillance where disruptions or distractions would be most damaging: (a)

Figure 9–Enclosed landscape is a compositional type that is particularly sensitive to the visual impact of manipulation. (Tomales Bay State Park, California)

Figure 10–Focal landscape is another compositional type in which the visual impact of manipulation would be conspicuous. (Machias River, Washington County, Maine)

near the closeby elements of a panoramic landscape; (b) toward a feature itself or areas (i.e., vegetation patterns) near or closely linked with the dominant feature of a feature landscape; (c) toward the expanse of floor and walls (their integrity) of an enclosed landscape; and (d) at the focal zone (convergence area) of a focal landscape.

LCPs can and should be located to account for such visual nodes as these specific landscape compositions. The higher the observer position may be, the more complete (and useful) the landscape view will be. These views need not bear any relationship to designated observation spots along a road or trail.

Conditions Affecting Viewing

Seasonal changes and the variations of sunlight angles during the course of a day will enter into how effective a particular LCP may be. Winter aspects may include the maximum color value (brightness) contrasts between reflective snow patterns and dark conifer cover. Or the presence of conifer patterns within deciduous hardwoods will be revealed in winter–a relationship apt to be obscure in summer. Spring and fall can present some other insights into vegetation pattern because of heightened contrasts in foliage color. The mosaic of various surfaces visible in combination needs to be considered for variations of seasonal change or annual stability: mineralized or barren surfaces, grassland and forbs, brushland or chaparral, conifer forest, hardwoods, and water bodies.

For a comprehensive sense of how contrasts in the landscape change through the year, photographic documentation should record that range. It is a key point that the visual image which is the most vivid–the one containing maximum seasonal contrasts–should be the most graphic record of the landscape.

The orientation of terrain and relationship to sun angle will contribute to clarity or obscurity of visual images from a given LCP, affecting both direct observation and photography. The north-facing slope tends to be obscured during mid-day by the shadows of backlighting–it will be better revealed as it may be directly lit during early morning or late afternoon. South-facing terrain with front and side lighting can be expected to show up clearly during the mid-day hours–and with more modeling early and late in the day. Westerly faces can best be viewed in the afternoon hours, while morning will be a better time for east facing surfaces.

Overlapping Fields of View

Certain segments of the landscape can typically be seen from a number of different observer positions and a variety of orientations. LCPs as tools for visual management need to reflect these differences. The characteristics of a frontal view can be so dissimilar from a sharply foreshortened one that the two may seem to have little in common. One view (one LCP) may also be judged to hold priority over another. Judgment of priority could be based on factors, such as seeing a greater expanse, having more relationships among parts revealed, or an advantageous orientation. This judgment carries over into the nature of how proposed manipulations will be seen–what disappears in one aspect can be conspicuous–perhaps degrading–from another viewing station. Making use of several LCPs should be expected to lead to possible relocation of proposed manipulations or to alteration of their form or scale.

PLOTTING THE VISIBLE LANDSCAPE

Plotting the plan coverage of areas visible from a Landscape Control Point may be done three different ways:

1. By direct field observation and reference to a topographic map.
2. By drawing a series of sections radiating from the LCP, transferring points from section to topographic map, and connecting points into visual limit lines on the map to form a "sectional" plot.
3. By employing a computerized technique, such as VIEWIT, which computes the area visible from one LCP (or many) and produces an overlay map (Elsner 1971).

Each of these methods offers certain advantages or disadvantages, such as requiring more time or less, greater accuracy or less. As an example, compare results from the three procedures, and their differences based on a common LCP *(fig. 11).*

Direct Field Plotting

By taking a topographic map into the field and going to a selected LCP, the observer may transfer the visual limits of his observation to the map. This procedure will be familiar to anyone who has used a topographic map for location and orientation. It merely goes a step further in which visual boundaries are estimated relative to land forms and other elements, and those boundaries are set down as lines on the map.

The U.S. Geological Survey 7½-minute maps (1:24,000 or 1 inch = 2,000 ft.) are most desirable as base maps. Portrayal of land forms and features is normally clear enough and at sufficiently large scale so that locating visual limits can be done with relative ease and accuracy. These maps reduced 50 percent to a scale of 1:48,000 (1 inch = 4,000 ft.) can also be used and offer the convenience of smaller size. However, 15-minute topographic maps (1:62,500 or 1 inch = approx. 1 mile) are considerably more difficult to use because of possible errors in land form identification and problems of making the small scale plot. Therefore, their utility should be considered marginal.

A number of factors will affect the results of plotting in the field. Selection should be made of those times of day which will give the advantages of positive sun angle.

For any given LCP–which establishes a general orientation of view–sidelighting should be most advantageous. The flatness of front lighting makes it somewhat less desirable because land forms tend to merge with one another. Back lighting should be avoided, because of the obscurity it casts upon specific parts of the landscape. Weather or atmospheric conditions will also be recognized for the effects they have on visibility and can affect the quality of field work to be expected. The seasonal aspects of regional weather should enter into selection of better times for this particular kind of exercise.

Apart from direct plotting, it may also be the purpose of field work to compare a VIEWIT overlay or "sectional" plot to the actual landscape involved. This would be followed by photography (Step 3) and sketches (Step 4).

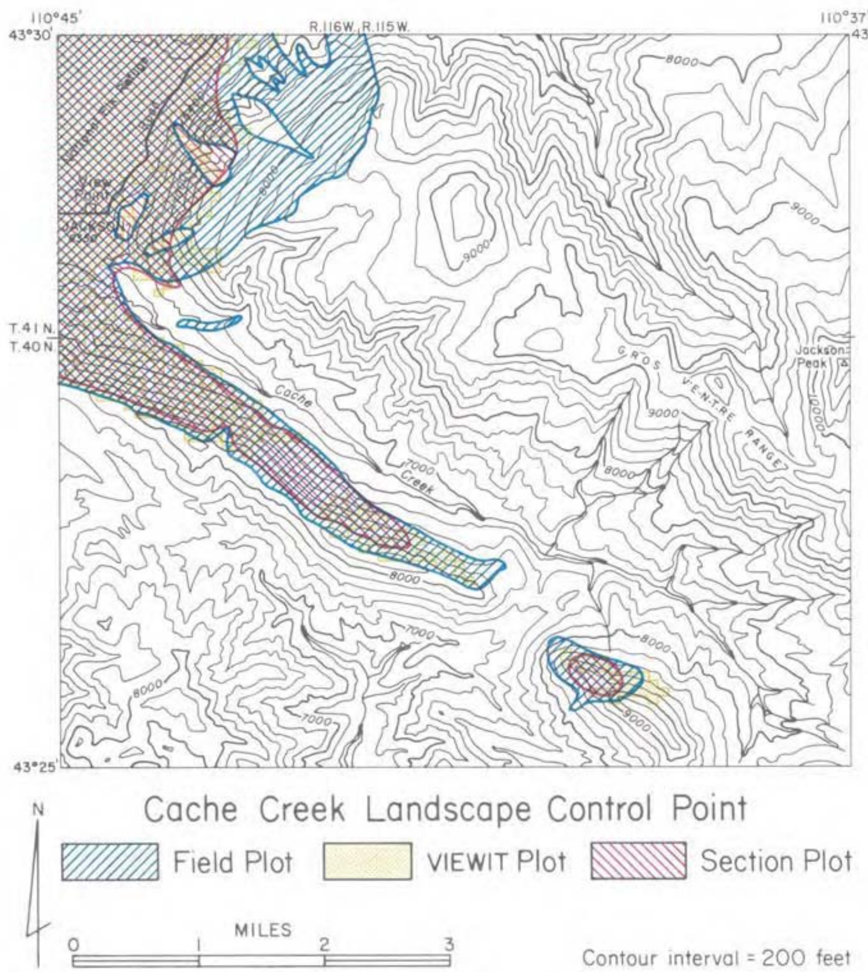


Figure 11–Three ways of map plotting areas visible from a Landscape Control Point: (1) field plotting–direct observations and mapping the visual limits of what is observed; (2) plotting with sections–from a series of sections, lines of sight are drawn to determine visible and invisible areas; (3) computerized plotting, such as VIEWIT–using data on elevations, viewing location, and length of sight line to produce overlays. Photo mosaic shows what is seen from a Landscape Control Point at Cache Creek, Jackson, Wyoming.

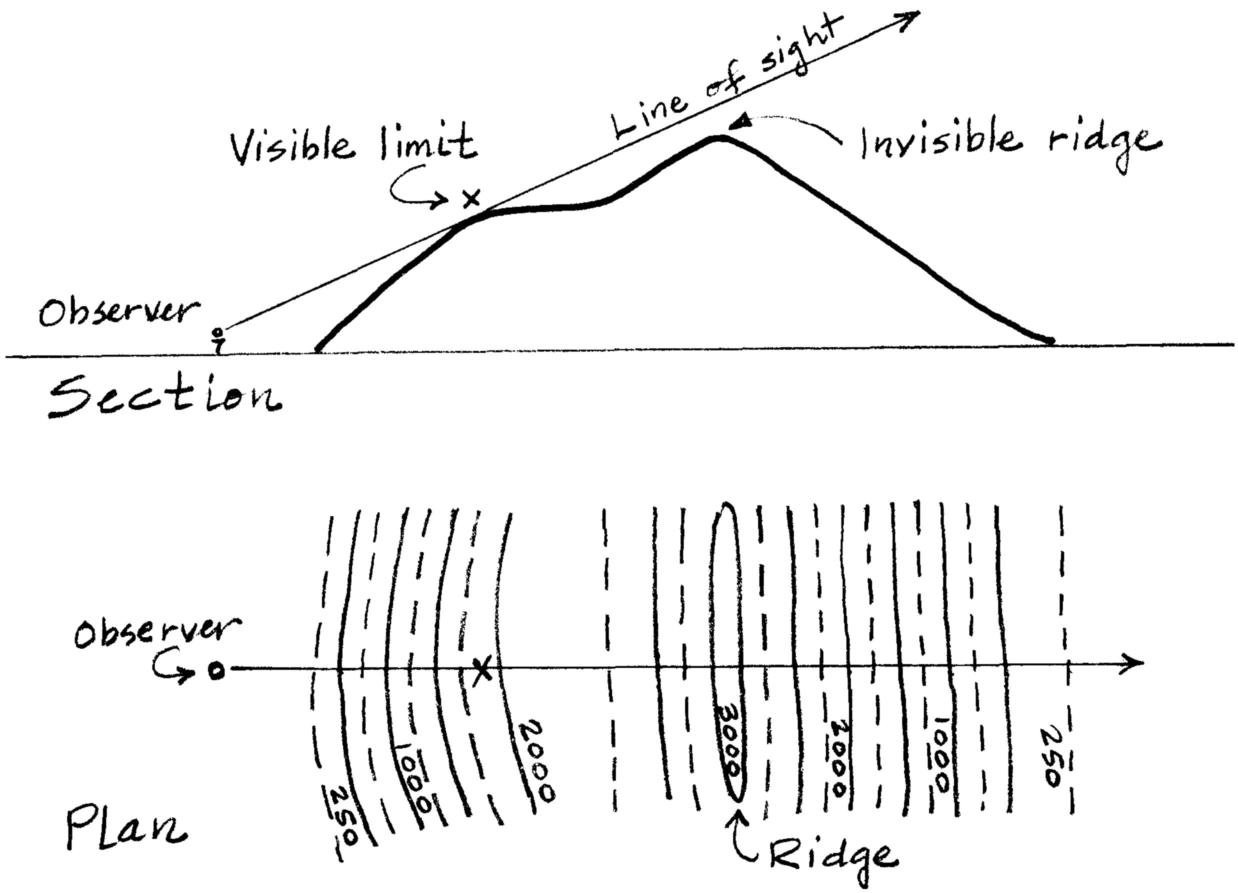


Figure 12–Common error in field plotting. The visible shoulder line is mistaken here for the ridge line.

Direct plotting has certain advantages. The individuals who are doing the work (several people can assist one another in confirming what is observed) must examine the landscape carefully. Peripherally, this approach may be thought of as drawing attention to the landscape as a scenic resource and could serve as an introduction to inventorying the landscape.

Plotting the sighted visual boundaries should take but little time. The field plot shown in *fig. 11* took 45 minutes at the site. Photography will best be done at the same time as the visual plot so that the two will show similar limits.

Some disadvantages to field plotting may also be noted. It may not be possible or practical to visit the site. Excessive distance or bad weather can well be impediments. Field plotting is done with variable accuracy and efficiency, depending upon the capacity and tendency of individuals. Furthermore the method is imprecise. The identification of all small invisible pockets should be considered impossible. And even if it were accomplished, it would not materially improve upon the generalized location of sighted limits. Plotting visual boundaries is only a means of indicating a particular area which may be subjected to various future manipulations.

Observers in the field will tend to overestimate visible limits. In *fig. 11*, the field plot embraces a larger area than either of the plots made by other two methods. This is most apt to be explained by thinking that ridge lines rather than shoulder lines are visual limits as the plotter looks for coordination between the map and the observed landscape *(fig. 12).* Additionally, invisible pockets–or some of them–are not readily apparent in the field.

Plotting with Sections

Visual limits may be plotted from a series of sections laid out as rays from a single LCP *(fig. 13).* With a U.S.G.S. 7½-minute topographic map, an LCP serves as the point of origin for whatever number of sections may be needed to define and locate a visual

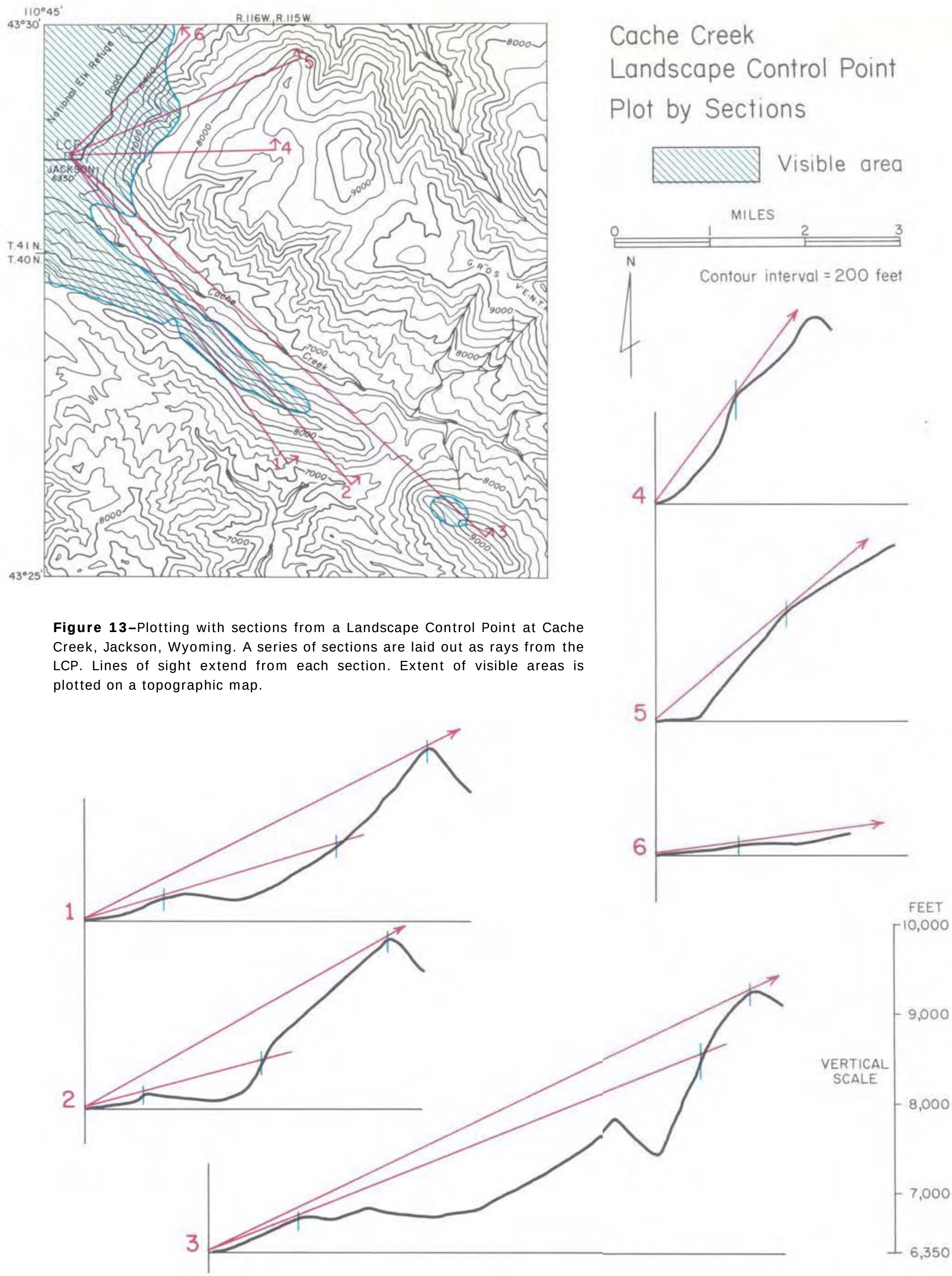


Figure 13–Plotting with sections from a Landscape Control Point at Cache Creek, Jackson, Wyoming. A series of sections are laid out as rays from the LCP. Lines of sight extend from each section. Extent of visible areas is plotted on a topographic map.

boundary in plan. On each section, lines of sight are drawn so that the extent of both visible and invisible areas may be determined. These results are then transferred back to the plan (topographic map) and point locations are connected by lines.

How many sections are needed to locate a plan line? Close examination of the particular topography involved will serve as a guide to both location and number of sections. Placement should particularly reflect characteristics of ridges: Their peaks, saddles and low points, beginnings or ends and changes of direction. Where valleys (enclosed landscapes or lake basins) may be screened by surrounding land forms, sections need to be located so that hidden pockets can be defined. So that topographic variations may be better reflected in sections for more accurate plan plotting, graphic sections should be vertically exaggerated two to five times the horizontal scale. (At a vertical scale of 1 inch = 800 ft., graphic accuracy in plotting will be about ± 20 feet in elevation.)

Although it is possible to make a visibility plot by exclusive use of sections, they may also be useful in an auxiliary way. A field plot could be completed or its accuracy checked by constructing sections. This method combines several advantages–field reality (sense of the landscape) with the control of the graphic sections.

Sectional plotting can be done in the office. Travel to the actual area is not necessary. Therefore, both travel time and cost are avoided. Those necessary weather conditions for satisfactory field work do not have to be met since the office procedure can be a rainy day job.

The construction of sections and their application to defining visible areas is a simple undertaking. Only a minimum of instruction and minimum drafting ability are required. Drafting tools and supplies are those that would normally be on hand in any office. More tenacity than skill is involved. The only absolute necessity for going ahead is availability of topographic maps.

Plotting with sections has certain limitations. Sections and their related LCP determined wholly from a topographic map may not reflect actual landscape visibility. The LCP could be screened by vegetation or by terrain detail going undetected because of a gross contour interval. This limitation should again confirm desirability of combining the sectioning procedure with some knowledge of field conditions so as to avoid errors of judgment.

Sectional plotting in the office avoids cost and time spent in travel to a field point, but is a time-consuming job. Amidon and Elsner (1968) indicate that "the cost of constructing hundreds of profiles (sections) would be...prohibitive." Cost comparisons among the three plotting methods are not known except that for *fig. 11* (Cache Creek LCP), the field plot took 45 minutes and the sectioning plot (eight sections) took 1½ hours. Coding the Cache Creek 7½-minute quadrangle map required 8 hours, and the computer time for the single LCP printout was 15 seconds. In addition, the computer data base may be used for 11,288 different visibility plots as each coded cell may represent an LCP (i.e., another plot) while each of the other two methods gives only one plot.

Computerized Plotting

Computation of terrain visible from a given point can be done by employing VIEWIT, a FORTRAN subprogram developed by Amidon and Elsner (1968). The input consists of elevations put into a coordinate system, and the selection of a viewing point, location and length of sight line. The end product is an overlay map.

In principle, plotting by sections and the VIEWIT procedure are similar. Lines of sight scan surrounding land forms and higher elements screen out lower elements.

The 7½-minute topographic map is again the source of data *(fig. 14).* A grid is prepared with coordinates corresponding to the printing scale of six characters per inch vertically and five per inch horizontally. In this case, the grid or cell size is equal to two characters and covers 3.1 acres. For each cell, elevation was estimated by interpolation to the nearest 100 feet and is represented by two digits.

Translation of the topographic data may also be through the digitizer tracing contours. Each cell which is intersected by a contour is given that particular elevation to the nearest foot. Empty cells can be filled by interpolation of data in surrounding cells. The digitizer will simplify and speed up the elevation coding.

The major advantage of the VIEWIT procedure is the flexibility offered in plotting viewed areas as seen from any observation point (any cell) of a given matrix which has been coded. Once the elevational information has been gathered, any LCP and viewing distance may be chosen.

Other advantages are similar to those for sectional plotting. VIEWIT is an office procedure; it is economical in its efficiency, speed and flexibility. In theory, it requires no field work, but in practical application it should be used with field observations–materially shortening and simplifying field work.

The disadvantages of the VIEWIT procedure are, again, similar to those for sectional plotting. Actual visibility from a selected LCP may be screened by topography or vegetation that is not shown on the base map. For known vegetation, allowances can be made.

With more facilities obtaining computer services all the time, the potential for putting the VIEWIT program into effect is easier now than it has ever been.

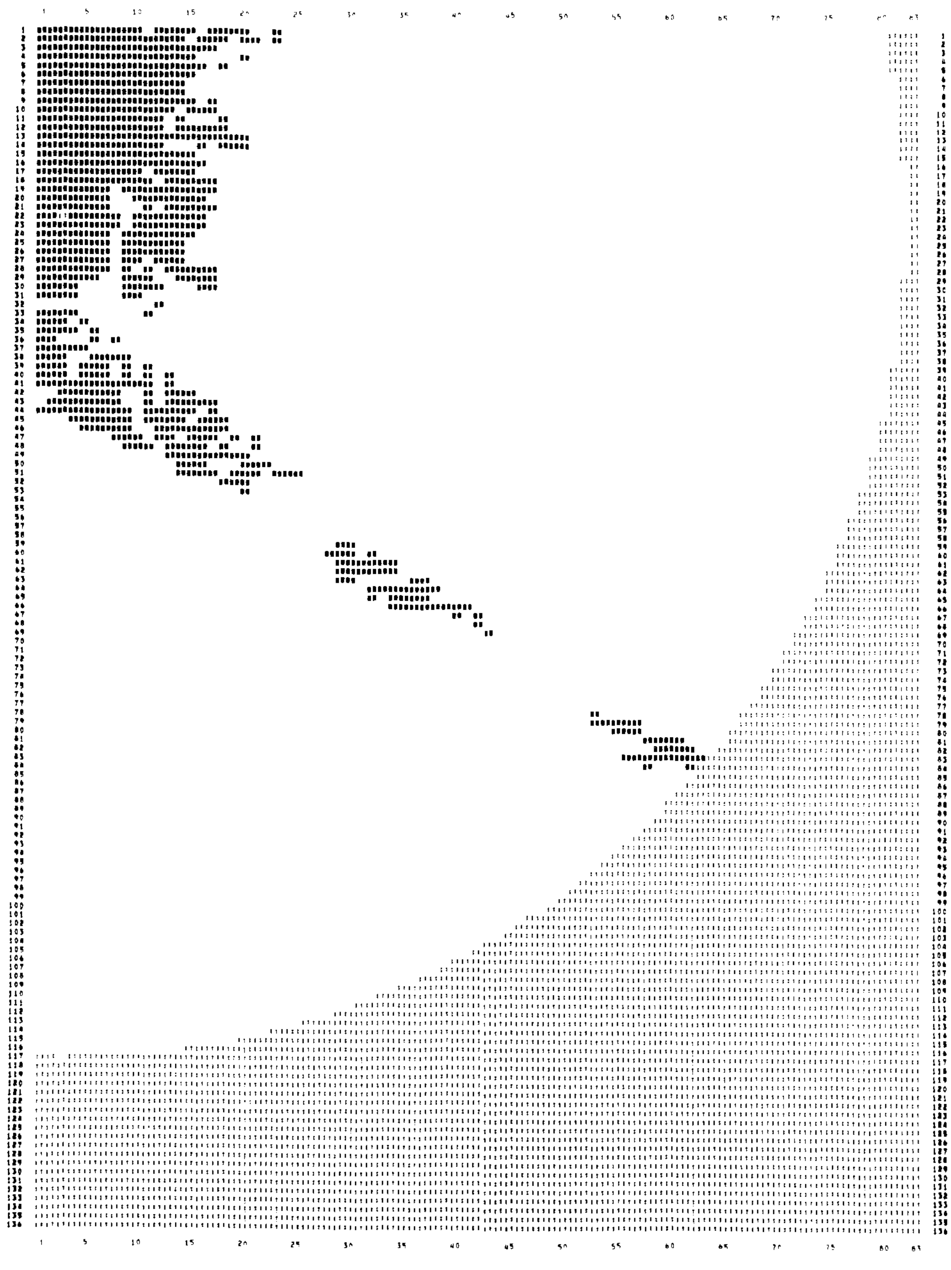


Figure 14–Computerized plotting by VIEWIT program, from a Landscape Control Point at Cache Creek, Jackson, Wyoming. Lines of sight scan the visible area. Data on elevations, by coordinates, are obtained from maps. Each cell in the grid covers 3.1 acres. For each cell, elevation is established by interpolation. The computer produces an overlay that shows the maximum area visible from the LCP.

A CASE STUDY

Teton National Forest

How the five-step procedure in visual analysis can be applied is illustrated by a case study on the Teton National Forest in Wyoming. The choice of that Forest was suggested by a number of reasons. Very heavy tourist and recreation use of the Grand Teton and Yellowstone National Parks directly and indirectly involve the Teton Forest. More than 160 miles of State and Federal highways converging upon Jackson Hole and within it either pass through or provide views into this Forest. Air routes coming in and out of Jackson Hole give sweeping overviews of the area.

Jackson Hole is used as a focus and limitation within this report–treating more area only tends to be repetitious. It is of visual significance because it is common to both Grand Teton National Park and the Teton Forest. The basin is readily recognized to be a well defined space. Its floor is primarily open grasslands or sagebrush, providing unencumbered views of the Teton Range on the west and the lower ridges of the Gros Ventre Range on the east. From 55 percent (72 miles) of the 130 miles of improved or paved roads in Grand Teton Park, it is possible to see an enclosing ridge of the Forest on the east side. Because of heavy travel, it is significant that almost all of the 20 miles of Highway 89-187 between Gros Ventre River and Moran Junction affords eastward views of the Forest. Besides views originating from park roads and turnouts, there are the even more numerous opportunities of observation from pedestrian locations. Air views, while not emphasized in this paper, are also added to the ground views. It is not unusual to find National Parks surrounded by National Forest lands, but the degree of intervisibility between these two is particularly noteworthy.

Simply because certain areas are visible does not necessarily make them subject to alteration from timber cutting, road construction, or other activities. From within Jackson Hole, four kinds of activities can be observed on the visible slopes of the Forest: roads (State Highway 22, for example), powerline clearings, ski area clearings, and timber cutting. All of them cause visible changes in the surface pattern of the land through removal of vegetation and exposure of soil or sub-soil.

Areas of harvestable trees do remain and are subject to future cutting. A set of strip cuts in lodgepole pine (Curtis Canyon Timber Sale) made between 1956-1963 is visible along Highway 89-187 and especially from the Grand Teton National Park overlook. Public criticism of these conspicuous, manmade strips led to the Forest Supervisor's decision that they should be altered to fit better with the landscape. Such a recut poses what might be called a detail within management of the 'Teton Forest, yet it also raises the general problem of visual control. Additionally, it carries with it the need to recognize and control the visual changes which take place over time as successive cuttings of a working circle occur. This specific recut detail, then, contributed to the suitability of this particular Forest for study.

Application

To cover most of the Teton Forest that may be seen from within Jackson Hole, I set up nine LCPs. Locations were chosen primarily in relation to roads but also to reflect scenic turnouts and other points affording comprehensive views. Where certain views were essentially similar except for the difference of shorter or longer distance to terminal elements, I chose the shorter. As an example, the view toward Sheep Mountain and Jackson Peak from an LCP at Teton Village or one at the south boundary turnout of Grand Teton National Park (at Highway 89-187) is much the same, the difference being that the latter LCP is 5 miles closer to Sheep Mountain and Jackson Peak. From Signal Mountain (LCP No. 2) the maximum sightline distance is 12 miles. However, for all other LCPs, maximum sighting distance varies from 4 to 8 miles. Distances between LCPs are as much as 13 miles and as little as 3½ miles; their combination accounts for a continuously visible strip of landscape, although it contains invisible pockets (or visual voids).

No control points were established along Highway 89 north of Moran Junction, in the vicinity of Jackson Lake. This is because of virtually complete tree screening along the east and the nearby presence of the Teton Wilderness. But the Teton Forest "corridor"–the National Forest land area between the two national parks along this road–represents an especially sensitive management situation which would be a logical area for extension of the Jackson Hole LCP system.

One map *(fig. 15)* includes the framework made by the series of LCPs set up around the perimeter of Jackson Hole. The location of each viewing station and the relationship of one to another can be seen. The scope of view (a range of 75° to 205°) and the area visible from each point can also be seen. Since the map scale is small, a name was given to each LCP to confirm identity and general location.

Another map with photographic view *(fig. 16)* shows a single LCP imposed on a topographic map of larger scale than *fig. 15*. This LCP is an enlarged version of LCP No. 1 on the framework map. The larger scale plot (approximately 1/2-inch = 1 mile) makes identification possible as based on terrain characteristics. In practice this should be a workable scale for recording LCP coverage and the framework as well. The limitations of size imposed by this study's format precluded showing more than a sample of the LCP plot at this practically useful scale.

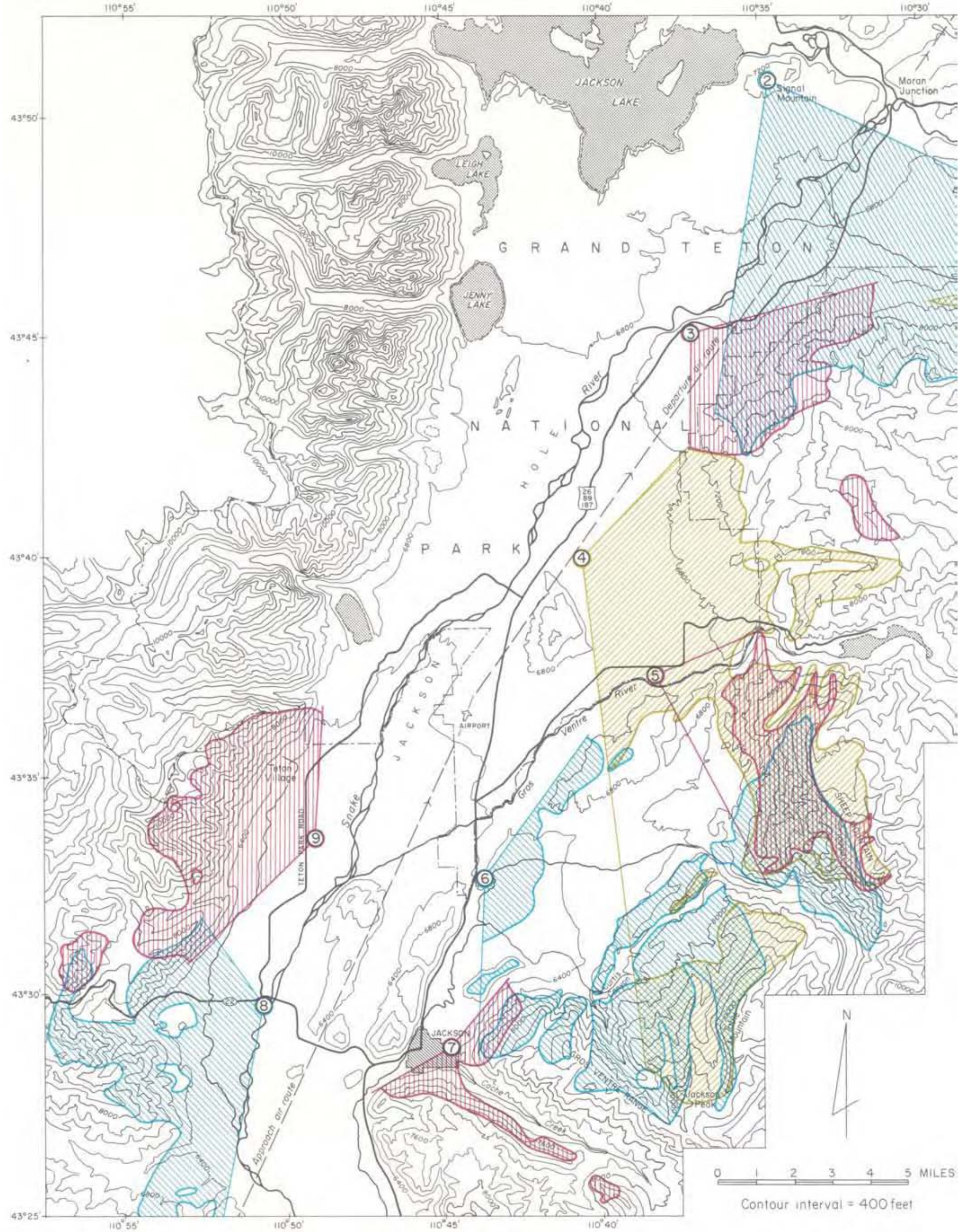
A set of four photographic panoramas *(fig. 17)* correspond to the views from four contiguous LCPs numbered 3-6 on the framework map. While these represent only a sample of the LCP views from the framework, they do show connected segments. These photographic panoramas are reduced for printing to a smaller size than practical in actual use. Even the photographic view *(fig. 16)* is only 1/3 the size of a panorama that would be useful in practice. The "working" panorama view needs to show characteristics of the landscape in such size and detail that overlays showing possible alterations are reasonably easy to prepare.

Two field sketches *(figs. 18, 19)* portray detail views taken from LCP No. 6 at the Grand Teton National Park overlook on Highway 187 near the fish hatchery. These pencil studies concentrate on the visual relationships of the Curtis Canyon clearcut strips upon the west slopes of Table Mountain. The cut strips stand out for their own pattern and also assume importance because they occupy a position close to Jackson Peak–a conspicuous feature along this ridge. Detail views may also be prepared photographically by use of a telescopic lens, but there are some advantages to freehand drawings. Sketches can abstract, simplify, and emphasize major characteristics in ways that photographs may not. The sketches are not intended to distort what they represent, but drawings can be a most helpful tool in providing interpretation of significant landscape characteristics.

Two revised sketches *(figs. 20, 21)* show possible ways in which the Curtis Canyon strip cuts *(fig. 19)* may be altered. Since the basic purpose of adopting a recut pattern here is to achieve a better fit with the landscape, certain of the visual design criteria used need explanation. In looking at the immediate surroundings, the most obvious natural characteristic is the expression of horizontal lines–transverse to the strip direction. The long and essentially level lines will be seen in the ridges above and below the cuttings, in the vegetation edges meeting the upper scree surfaces and in the edges of the lower grass lands contrasted to conifer forests. Natural openings seen here display continuity–the connection of one opening to another. The natural openings also tend to have and repeat a lens-like shape as well as a common alignment.

Because the man-made cuttings have a pattern which contrast strongly to that of the surroundings, they stand out. The suggested sketches rely heavily upon developing both horizontal line emphasis and a connection between openings. The changes, then, seek a unification that can emerge from repeating the concepts seen in certain landscape characteristics of this particular place.

The problem of reworking strip cuts represents a small and atypical application of this visual review procedure, but it does offer a specific demonstration of the concept. Most importantly, the review and criticism of visual alternatives such as these are not merely for selection of the solution which is judged to "look best." The examination of visual displays can, however, lead to constructive refinements incorporating the expertise of various disciplines. If graphic portrayals suggest such impacts as questionable regeneration conditions or erosive runoff, for example, then corrections should be made accordingly.


110°55'
110°50'
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43°50'
43°45'
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JACKSON LAKE
LEIGH LAKE
JENNY LAKE
Signal Mountain
Moran Junction
GRAND TETON NATIONAL PARK
Departure air route
Approach air route
JACKSON HOLE
Snake River
Gros Ventre River
AIRPORT
Teton Village
TETON PARK ROAD
JACKSON
Cache Creek
Jackson Peak
GROS VENTRE RANGE
SHEEP MOUNTAIN
N
0 1 2 3 4 5 MILES
Contour interval = 400 feet

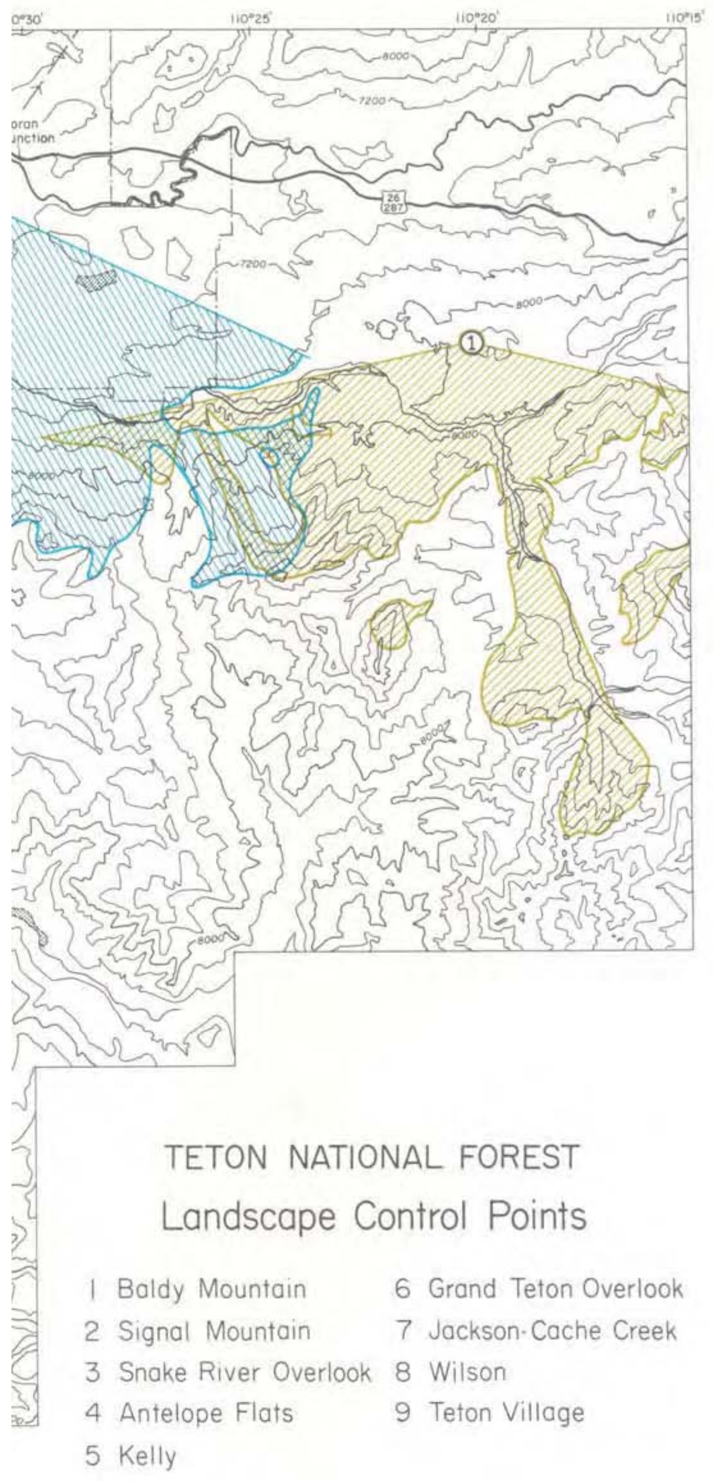
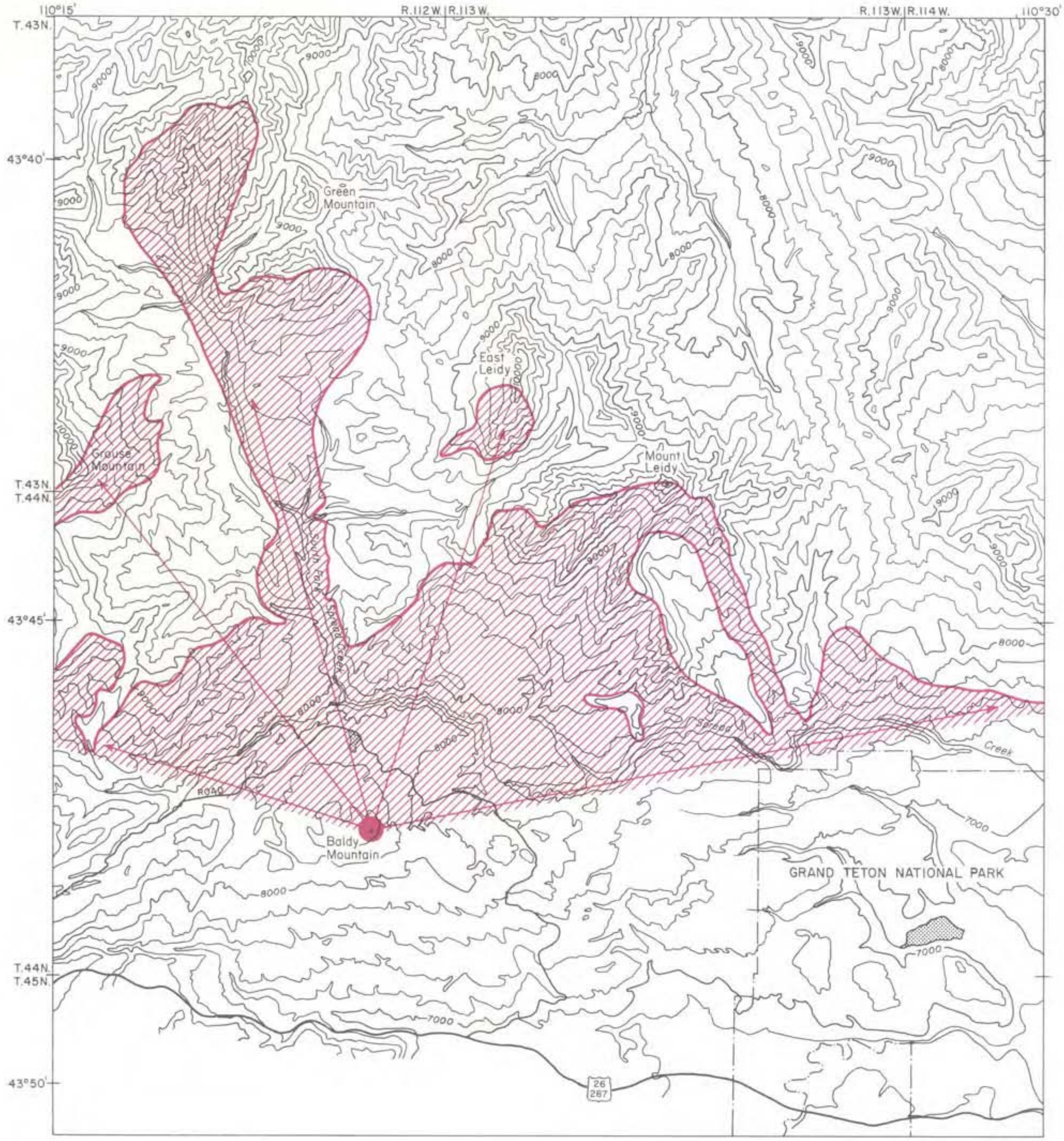


Figure 15–Framework for visual analysis of the Teton National Forest, Wyoming. Nine Landscape Control Points were set up around the perimeter of Jackson Hole, Grand Teton National Park. Areas visible from each LCP are hachured.


110°15'
R.112W.|R.113W.
R.113W.|R.114W.
110°30'
T.43N.
43°40'
Green Mountain
East Leidy
Grouse Mountain
Mount Leidy
T.43N.
T.44N.
43°45'
South Fork Spread Creek
Creek
ROAD
Baldy Mountain
GRAND TETON NATIONAL PARK
T.44N.
T.45N.
43°50'
26
287
9000
8000
7000

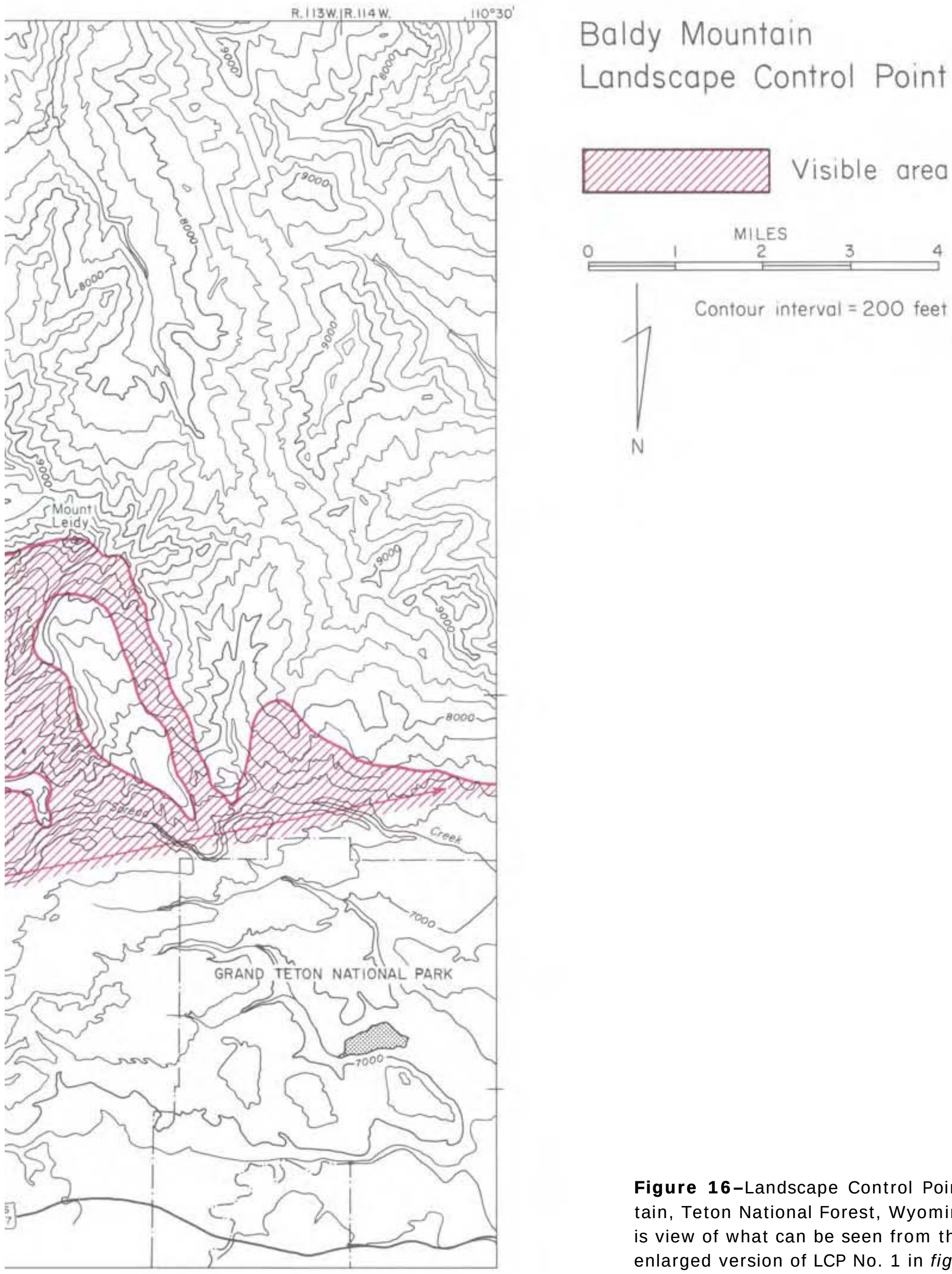


Figure 16–Landscape Control Point at Baldy Mountain, Teton National Forest, Wyoming, with panorama is view of what can be seen from there. The LCP is an enlarged version of LCP No. 1 in *figure 15*.

LCP No. 3

LCP No. 4

LCP No. 5

LCP No. 6

Figure 17–Four photographic panoramas corresponding to views from four contiguous Landscape Control Points (Nos. 3-6 in *figure 15*), Jackson Hole, Grand Teton National Park, Wyoming.

Figure 18–Harvest cuttings at Curtis Canyon, Teton National Forest, Wyoming, as sketched from Landscape Control Point No. 6 (Jackson Peak, and Table Mountain shown) Grand Teton National Park.

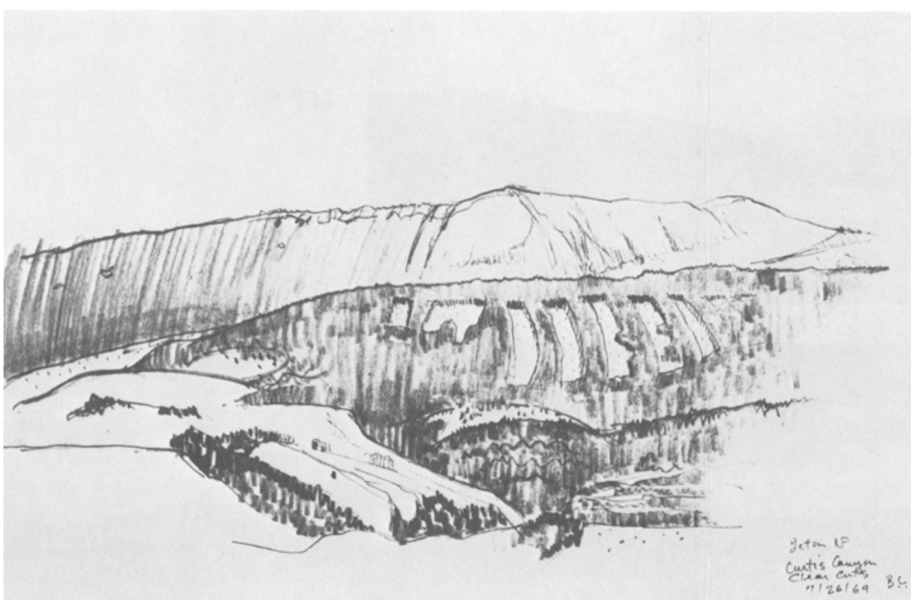


Figure 19–Harvest cuttings at Curtis Canyon, Teton National Forest, Wyoming, as sketched from Landscape Control Point No. 6 (Table Mountain shown) Grand Teton National Park.

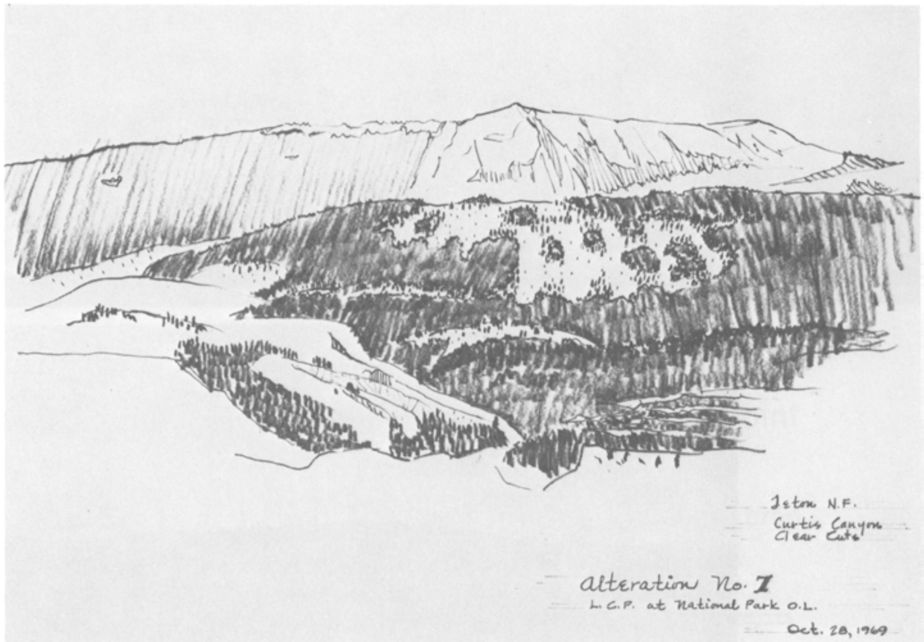


Figure 20–Possible way in which cuttings at Curtis Canyon, Teton National Forest, Wyoming, could have been altered.

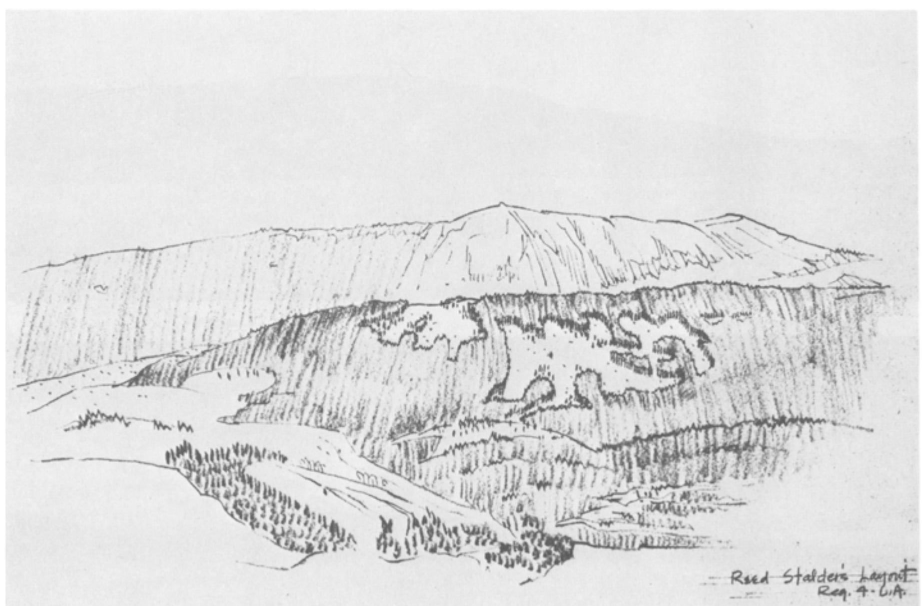


Figure 21–Another alternative in the pattern of cuttings at Curtis Canyon, Teton National Forest, Wyoming, so as to achieve a better fit with the landscape.

SUMMARY AND CONCLUSIONS

Litton, R. Burton, Jr.
1973. **Landscape control points:** a **procedure for predicting and monitoring visual impacts.** Pacific Southwest Forest and Range Exp. Stn., Berkeley, Calif. 22 p., illus. (USDA Forest Serv. Res. Paper PSW-91)

Oxford: 907.1:U712.01.
Retrieval Terms: landscape management; visual impact; recreation areas; landscape control points; Teton National Forest.

Landscape Control Points–a network of permanently established observation sites–provide the forest manager with the means of studying the visual impact of alterations to the landscape. Observations are supported by topographic maps, panoramic photographs, sketches, and overlays. Visual analysis of the landscape is done by a five-step procedure: (1) establish a net of Landscape Control Points to provide a reasonably continuous view of the extended area; (2) plot on a topographic map the limits of the visual area seen from each LCP; (3) photograph a panoramic view from each LCP, selecting a suitable time of day and season for each situation; (4) prepare perspective field sketches as a base for more precise studies of possible changes and alternatives; and (5) use the LCPs and graphic information derived from them to project the possible impacts of planned changes.

Criteria for LCPs affecting their location and use involve relationships to roads, trail, air routes, areas of concentrated use, overview covering landscapes of special value, conditions that affect viewing, and overlapping fields of view and different views of the same landscape segment.

Several methods of plotting the visible landscape are available to the forest manager. They include: (a) direct field observation and reference to a topographic map; (b) drawing a series of sections radiating from an LCP, transferring points to a topographic map, and connecting points on the map to form a "sectional plot"; or (c) computing the area visible from one or several LCPs and producing an overlay map by computerized technique.

Use of the LCP framework is primarily concerned with predicting a range of alternative visual impacts upon the landscape. It can also demonstrate that some landscapes (as portrayed from a set of LCPs) are more sensitive to change than others. A case study of visual analysis on the Teton National Forest, Wyoming, illustrates this condition. As the characteristics of sensitive landscapes are better defined and better known, it should lead to better criteria and more exacting management.

Studying alternative kinds of changes, as presented graphically from a specific LCP, allows different disciplines to assess impacts as they may be interpreted from visual displays. This evaluation should offer an opportunity for thinking in visual terms–especially if this is not a typical concern for a given discipline. Using the examples of *fig. 20* and *fig. 21* as but two ways in which cutting patterns might be executed, what might your response be if your field was wildlife management? Silviculture? Hydrology? Engineering and logging technology? Landscape architecture?

If you prefer *fig. 20* over *fig. 21*, the reasons behind your response are what will be of value, not the mere preference. Those representing wildlife, logging systems, fire, and landscape architecture could be expected to have concern for the handling of edges or the relationships between margins and topography. Those representing silviculture, road engineering, soils, disease control, and landscape architecture could be expected to have concern for the size of cuttings, their location and distribution as related to the terrain. Points of agreement, disagreement, and open choice should lead to solutions which combine multidisciplinary objectives within visual end-products.

A visual display by itself may not present enough (or useful) information to a particular respondent. There will be the need to examine the scope of the problem which goes beyond the isolation of the display. Or there may be the need to investigate details that cannot be portrayed by graphically generalized images of the landscape.

Use of the LCP framework and procedure should lead to different disciplines getting together on choices. The more desirable alternatives may result from criteria which come out of the pilot LCP studies or sample applications in specific situations. The feasibility of blanketing a whole forest with LCPs is questionable, and the selection of both typical and critical samples may well be the best way of trying out this means of visual control. If issues are not considered sufficiently critical to warrant a complete survey, the LCP method could be applied in a more casual way–yet accounting for special problem situations.

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