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GUIDELINES FOR DESIGN AND LOCATION OF OVERNIGHT BACKCOUNTRY FACILITIES

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A NOTE TO THE READER

These guidelines have been prepared under the direction of the Backcountry Research Program, USDA Forest Service, Northeastern Forest Experiment Station, Durham, NH, in cooperation with other groups or individuals as mentioned. The purpose of the guidelines is to present up-to-date, practical information on a number of subjects concerning backcountry management. The guidelines do not present policies, regulations, or rules, but simply a series of "state of the art" papers.

As new information becomes available, there will be a need to update these documents. Therefore, if you see items you would like to comment on, or know of pertinent information which could be added, please send it along to the Backcountry Program. Revised issues of a particular volume may be compiled as time and funds permit. Appropriate credit will always be given where it is due.

Also, if you have some suggestions on major areas of interest that might deserve treatment in a "Guidelines" document, please send them along, too. At the end of this report is a listing of topics already outlined, but not necessarily completed. You may know of some others!

R. E. Leonard

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INTRODUCTION

This guideline is a summary of pertinent information on the selection and design of sites for overnight backcountry facilities. It is intended to be a practical guide, incorporating both experience and technical information. The first part of the guideline discusses location criteria for overnight facilities while the second part makes recommendations for laying out facilities so as to minimize the impacts of recreational use.

This report is intended for use after some preliminary planning has already been done. In particular, it is assumed that the need for an overnight facility in some general location has already been established. These decisions are presumably based on a number of considerations including the funds available, location of nearby facilities, expected visitor numbers and use patterns, land ownership, permanency of the trail location, nearby land uses, the location of scenic areas, and of course, land use policies relating to overnight shelter sites. However, designs of specific facilities to be used may not be known at this time because local site conditions are likely to be a deciding factor.

SITE LOCATION

A variety of information is needed to make a complete inventory of potential site locations, and to choose the best area. Maps and aerial photographs may be reviewed to make a preliminary site survey. In the field, a combination of soils, subsurface conditions, topography, aspect, vegetation, and water supply should be considered when making the final decision (Fig. 1).

In all likelihood, the final choice for the location of an overnight facility will be a compromise between the ideal and what is available. How far one may stray from the ideal when choosing a new site is mainly a matter of cost; given the resources, an environmentally-sound overnight facility can be built practically anywhere. Whether or not it is worth the investment or is aesthetically pleasing, is another question. Consequently, it is up to the backcountry manager to weigh and apply, the following information in light of the particular situation.

The criteria and tools suggested here should be used as a "filtering mechanism", whereby each site is weighed against the entire series of factors. This will reveal both the totally unsuitable sites, and the limitations of the feasible ones, so that the final selection is based on sound evidence.

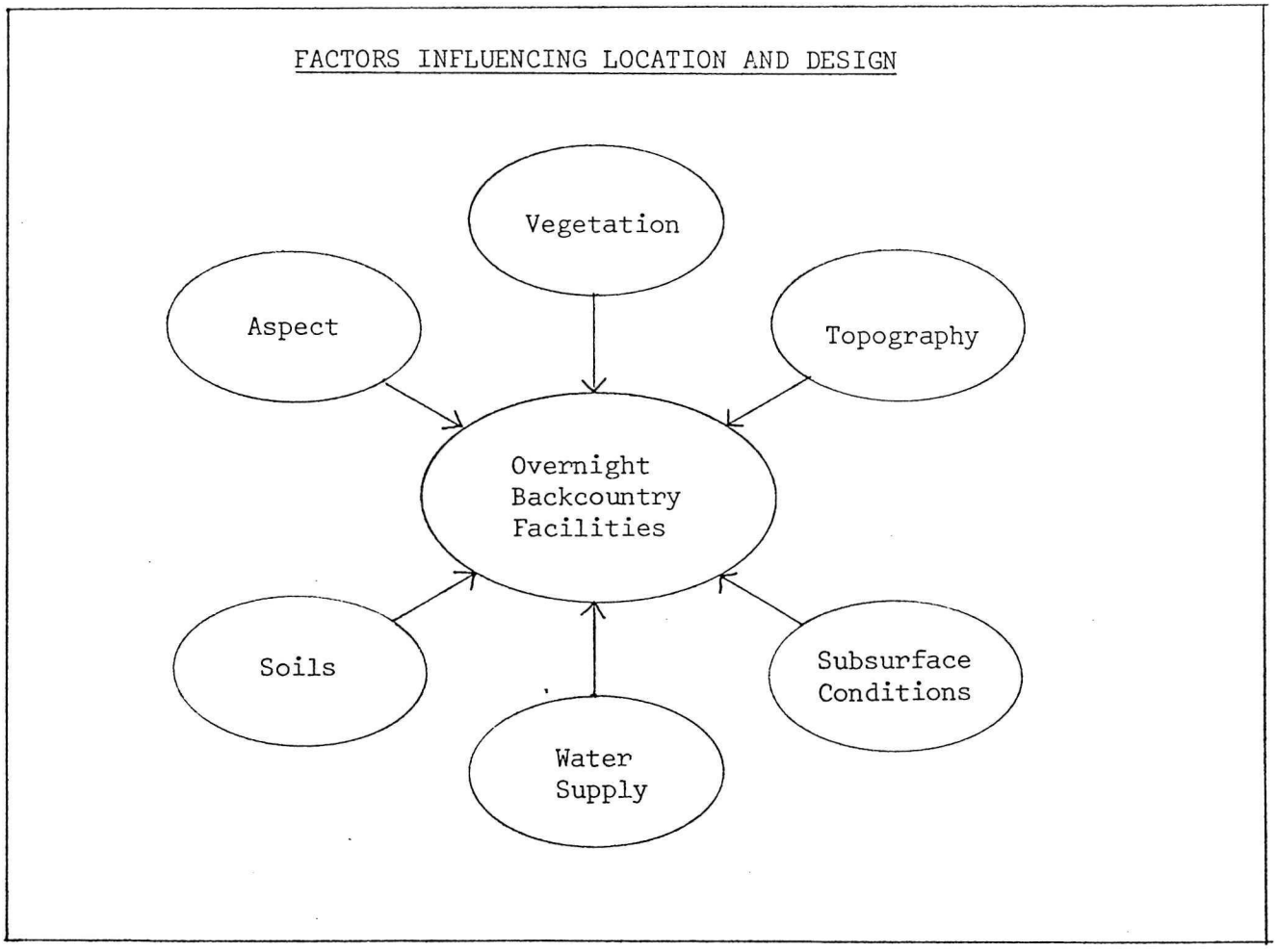

FIGURE 1. Factors Influencing Design and Location of Overnight Backcountry Facilities.

MAPS AND AERIAL PHOTOGRAPHS

Some preliminary work on site location can be done before going into the field. Maps are no substitute for field reconnaissance, but they can be valuable in initial stages of site planning. Generally, the best maps available are the United States Geological Survey (USGS) maps. These come in two scales. The 15-minute series has a scale of 1:62,500 (1 inch equals 1 mile), whereas, the 7½-minute maps have a scale of 1:24,000 (1 inch equals 2000 feet). Maps of the latter scale, however, are not yet available for all parts of the country.

Maps provide a variety of information useful in identifying potentially suitable terrain for overnight backcountry facilities. Features such as gentle slopes, "benches", or "shoulders" in the landscape; springs, streams (or likely places to find them), and moderate elevation, may be noted from the map. Generally, the rule is: the higher the site, the more vulnerable it is to the impacts of recreational use. In the Northeast, 3000 feet above sea level appears to be the upper limit for overnight use, unless added maintenance dollars are available for "hardening" the site.

Small-scale aerial photographs viewed in stereo can also sometimes provide a head-start in locating a suitable site. Some of the information which photos can provide better than maps is as follows: (1) Predominant tree species (this can suggest something about soil conditions, ground vegetation, and the overall stability for shelter construction); (2) Features like rocky terrain, ledges, and ponds or bogs too small to show up on a map; and (3) Points of interest, like waterfalls, lookouts, and interesting rock formations.

SOILS AND SUBSURFACE CONDITIONS

Soils and subsurface conditions are important indicators of site durability. Soils determine the capacity of a site to safely accommodate privy wastes, and are important in terms of compaction, erosion, and drainage. Where a large facility is a possibility, soils also determine the foundation requirements.

Subsurface conditions, such as depth to bedrock or other impervious layers, and depth to seasonal high water table are also significant. Shallow depth to bedrock, for example, is often associated with highly erosive soil conditions and poor vegetation cover; these sites are commonly very rocky, though this is not universally true. When the depth to the water table is shallow, the use of a site may be limited to a short season, if it is permitted at all. These same conditions usually severely limit the use of a pit privy waste disposal system.

A summary of soil and subsurface conditions, and their implications, is given in Tables I, II and III. It should be remembered in using these tables that they represent single factors viewed independently; so, a site may be suitable for a privy based on depth to bedrock, but may be disqualified on its soil drainage characteristics.

Based on experience and the information available, soil conditions characterizing a suitable site would be deep (5^{+} feet), well-drained, loamy-textured soils that do not have a water table or impervious layer within 5 feet of the surface. Deviations from this norm are, of course, very common. A survey of 71 shelter sites in New England, for example, revealed 20 sites

TABLE I

SOIL CHARACTERISTICS

DESCRIPTION	GENERAL IDENTIFICATION	IMPLICATIONS
Coarse (sands, gravel)	Light color, gritty when rubbed between forefinger and thumb, cannot be molded and hold its shape (i.e., non-plastic); particles .05-2mm in diameter.	Vegetation may be relatively sparse root systems often shallow, providi little erosion protection; wastes may percolate too rapidly, potentially contaminating ground water; fertility will require fertilizer t support rehabilitative crop of gra generally poor to moderate conditi for a site.
Medium (loam soils)	Medium brown mixture of sand, silt, and clay; often exhibits a granular or crumb-like structure; generally cannot be molded and hold its shape (i.e., non-plastic); wetted material will not stick to finger or thumb if pressed together (i.e., not sticky).	Vegetation cover normally fairly good in the absence of excessive use; good soil structure generally minimizes compaction and erodibilit percolation rate acceptable for filtering of wastes; natural regenerative properties of vegetation good; good to very good conditions for a site.
Fine (clays, silt)	Clays are medium brown to yellow brown in color; very hard and cemented when dry; greasy feeling when wet; may be molded permanently when moist (i.e., plastic); silty soils are floury feeling when dry, do not stick together when wet (i.e., non-cohesive).	Soil will exhibit considerable puddl ing when wet, concrete-like when d may be severely compacted and prev plant growth; percolation rate ver slow limiting usefulness of leaching waste methods (privy); may make a good site where privies are not us and aesthetics of minimum importan
Organic	Dark brown to black color; often wet or waterlogged; associated with bogs and other wetlands; spongy under the feet.	Vegetation may be abundant, but generally very fragile and suscept to damage; erosion due to hiker impact can be severe, particularly where there is some slope; leachin methods of waste disposal are not acceptable; not recommended for site development.

TABLE II

SUBSURFACE CONDITIONS - DEPTH TO BEDROCK OR IMPERVIOUS LAYER

Depth	Implication
0 to 15 inches	Very thin soil; often highly erodible where soil is largely organic matter; often very rocky; not suitable for pit privy; surface water often present, soil subject to puddling; severe limitations for site use.
15 to 40 inches	Thin soil; exhibits erodibility mentioned above if largely organic matter; generally unsuitable for a privy unless use very low (10/wk) and 24 inches of soil left below privy hole; often indicates durable sites when soil is well-drained mineral; poor to moderate site conditions.
40 to 60 inches	Moderate soil depth; normally very durable when well-drained mineral soil; suitable for privy when 24 inches of soil below pit bottom; moderate to good site conditions.
Over 60 inches	Moderate to deep soil; site durable when well-drained mineral soil; suitable for pit privy; good to excellent site conditions.

TABLE III

SUBSURFACE CONDITIONS - DEPTH TO SEASONAL HIGH WATER TABLE

Depth	Implications
0 to 15 inches	Water table very close to or at surface during at least part of the year; clues are seeps, springs, mottled soil, or wetland vegetation; conditions poor for tenting or other human contact with the ground; surface water common; often very erodible, not stable, when soils are organic; unsuitable for pit privy; severe limitations for site use.
15 to 40 inches	Water table close to surface, soil may appear poorly drained as indicated by clues mentione above; pit privy unsuitable unless very low use (10/wk), water table near 40 inches, and 24 inches of soil below bottom of pit; unseasonably high water table may close site temporarily; poor to moderate site conditions.
40 to 60 inches	Water table relatively deep; generally suitable for privy when 24 inches of soil between pit bottom and water table; good site conditions.
Over 60 inches	Associated with deep, dry, well-drained soil; soil conditions normally durable; pit privy suitable when 24 inches of soil between pit bottom and water table; excellent site conditions.

located on less than 25 inches of soil. Such sites are acceptable as long as use is very low, non-leaching waste disposal methods are used, and the sites are protected by use of appropriate facilities and good layout. In other words, less than ideal sites are more expensive to construct and maintain.

Several practical points are important with respect to soil and subsurface conditions. First, a good way to look for suitable soils is to carry an auger into the field and take frequent borings--even in places obviously not suited for a campsite. This will provide good background experience prior to any site selection work.

Secondly, the time of year is important to keep in mind. In the spring, when soils have been saturated by snow melts or heavy rains, water tables may be higher than usual mid-summer levels. Likewise, investigations made late in the summer may be a poor indicator of spring conditions.

TOPOGRAPHY

Topography is the general shape of the land. It is expressed in terms of elevation, percent slope, ledges, drainage patterns, and cold air movement. Soil and vegetation conditions, of course, are often closely related to these factors.

Generally, higher elevations (4000^{+} feet) characterized by exposed ridges and mountaintops are not suitable for overnight sites (Fig. 2). Soils are usually shallow, rocky, and sometimes poorly drained--conditions that make proper waste disposal an expensive proposition. Also, high elevations often mean that the potential for erosion is great. Vegetation at the higher

elevations is growing under very limited conditions, so this, too, makes these areas unusually fragile.

Fig. 2. High-Elevation Ridge -- Generally unsuitable for location of overnight facilities because of shallow soils, fragile vegetation, and severe climatic conditions. Note the catwalk constructed to keep hikers off the fragile vegetation and erodible bog soils.

Sites located on slopes of less than 10% are generally less prone to erosion. Ideally, terrain chosen for an overnight facility should have nearly uniform slope. Small but steep up's and down's, and irregular surface can quickly show signs of wear. Gently rolling areas can be very good because they are often well drained. In steep country, look for benches or shoulders in the landscape. As previously mentioned, these are best found by examining USGS maps, then visiting the sites. Often, soils of suitable depth, texture, and drainage may be found in these areas and not on the steeper, adjacent slopes.

It is especially important to be cautious in areas where there are steep ledges. Not only is there the hazard associated with the ledges, but also the scenic vistas often seen from the ledge result in considerable vegetation damage at the top of these geological features.

Depressions should be avoided because they do not drain well during the wet season or after a heavy rainfall. Also, care should be taken to avoid locating a site in a "wet season" drainage channel. Both these conditions are poor for camping, and equally important, privies should not be located where surface water collects, or where runoff may cause a pollution problem downslope.

Cold-air drainage is a common phenomena in mountainous areas where the cool, dense air near the summits settles into small valleys, often called frost pockets. Whenever possible, sites should not be located in these areas simply because they may decrease human comfort. Areas that typically collect this cold air are hollows, stream bottoms, and the base of a ravine or valley.

A last important point about topography is to choose a site where some of the surrounding landscape is suitable for expansion. This is not always possible, but it is a good idea in case there is a need for an overflow site for holiday weekends, or if use of an area grows unexpectedly.

ASPECT

Aspect relates to the direction a site is oriented. Generally, eastern, southeast, or southwest-facing slopes are best. Shelters facing an easterly direction are usually in the lee of the prevailing wind and therefore offer better protection from driving rain or snow. Also, people like east-facing sites for the comfort; early morning sun makes crawling from a warm sleeping bag less painful. A southwest-facing site, though apt to be somewhat more windy, has the afternoon sun and a view of the sunset. Sites facing a northerly direction are usually less desirable because they are windier and cooler. Also, snow arrives to stay earlier in the fall and remains later in the spring. A good view should also be a consideration where other conditions permit (Fig. 3).

Fig. 3. A Choice View for an Overnight Area. The mountains in the background provide an ideal setting for a sunset, or sunrise. A feeling of solitude is provided by the vast, undeveloped landscape.

VEGETATION

Vegetation is an important feature in any landscape. It influences human comfort features such as air movement, temperature, humidity, and visual screening from nearby campers. It can be an indicator of soil conditions in an area. The common vegetative conditions in the backcountry and their implications for site selection are summarized in Table IV.

The vegetation found at higher elevations (4000^{+} feet), particularly the alpine zone, is the least able to withstand the impact associated with overnight facilities. Some of the reasons for this are the short growing season which limits the time to recover from disturbance, the limited availability of soil nutrients for plant growth, and the severe conditions for seed germination. These alpine areas should be avoided for shelter sites, despite any view, because of this fragile vegetation, and also the commonly shallow soils and severe weather.

The subalpine forest zone (spruce-fir) and its transition into the deciduous forest is where most shelter sites are currently located. Distance from the roadside, a view, and usefulness as a staging area for longer climbs are probably the main reasons. In terms of this vegetation type, when these species are on moderately to well-drained soils, the site is usually resistant to human impact. Where these species are found in boggy spots, or depressions, however, the understory vegetation is normally very susceptible to human impact. Also, the trees are often shallow-rooted in wet areas and susceptible to windthrow if a small clearing is made. So, the general usefulness of a spruce-fir site will depend mainly on the soil drainage conditions.

TABLE IV

VEGETATION

TYPE	CHARACTERISTICS	IMPLICATIONS
Alpine Areas	Primarily small alpine or subalpine species intermixed with extremely dwarfed spruce and birch species; elevation above 4000 feet, varying with latitude and topography.	Very open, low-growing vegetation, air movement unlimited, little or no protection offered from the weather; soil and plant conditions resulting i highly susceptible to human impact; rare specie: may be present requiring special protection; generally represent unsuitable conditions for shelt sites.
Subalpine Spruce-Fir Forest	Primarily spruce or fir species; limited yellow birch or maple may be found; undergrowth of small, herbaceous plants; generally begins about 3000 foot elevation; may be found at low elevations in boggy area or wet areas.	Generally dense forest growth, air movement often limited, cool and shaded in the summer; trees ge erally shallow-rooted and susceptible to human impact; when found at low elevations the sites are often poorly-drained and not suitable for a shel area; (when found in wet areas the soils are poorly drained and not suitable for a site); at high el tions, sites dominated by these species are normally well-drained to excessively-drained, indic ting generally good sites, except shallow soil may limit use of privies; undergrowth normally very susceptible to human impact; generally represent poor to good site conditions.
Deciduous Forest	Primarily deciduous species; some hemlock along stream courses; generally found at elevations below 3000 feet, varying with the topography and aspect; undergrowth of various shrubs such as hobble bush.	Generally open forest land with good air movement and considerable shade for a site; species such oak, maple, birch, beech, and ash generally indicate relatively deep, well-drained soils; depressions may be uncommonly wet; most species resistant to human impact due to tight bark and deep rooting; birch being an exception due to peeling; screening between sites often minimal, unless forest clearing has brought in undergrowth; generally represent good to excellent site suitability.

The lower elevations where deciduous forest trees predominate are probably the least-used areas for overnight backcountry sites, yet the vegetation is probably the most resistant to human impact. The trees are deep-rooted and have generally tight bark. The understory vegetation is often dense and lush, and the generally good growing conditions permit recovery from recreation impact. Mountain laurel and other high brush growth, however, is often damaged when used as a "clothes line" for sleeping bags, etc.

WATER SUPPLY

A final factor to consider in site selection is the availability of potable (drinkable) water. This is still important despite the growing acceptance of "dry sites" where hikers must arrive carrying their own water.

Springs and small streams are usually preferred over ponds or lakes because their purity is more easily controlled. This is a growing concern as water quality laws grow more stringent on local, state, and national levels. Swimming, bathing, and dishwashing occasionally occur in larger water bodies, often only a short distance from where people draw their drinking water. Springs and streams, on the other hand, rarely become stagnant and are too small to bathe in. Their water tends to be cooler and fresher-tasting. Furthermore, the shores of ponds and lakes are relatively fragile areas which deteriorate readily under the frequent use they attract.

Scout for springs during the driest part of the summer. If you find one then, you can be reasonably sure it flows throughout the year. Follow small streams to their source. You may find a spring, within reasonable distance for a good shelter site. Also, where you find one spring, you are likely to find others. Sometimes, ground water reaches the surface because

of a certain geologic formation, such as the boundary between rock strata. It is sometimes possible to find numerous springs along an entire hillside just by walking the same contour in either direction.

SUMMARY OF SITE LOCATION FACTORS

Because of the variety in site conditions, and the different capabilities of managers to respond to limitations, a summary list of good and poor sites, based on the factors mentioned, can be misleading. Nevertheless, Table V has been compiled to indicate those conditions that generally tend to make a site poor, acceptable, or good. These are meant to be guidelines, not hard and fast rules, that can be used as a standard against which to evaluate a site. As mentioned earlier, poor conditions can be accommodated if sufficient resources are available; this might include non-leaching compost privies, a boardwalk built over boggy areas, or locating a caretaker to manage overnight use.

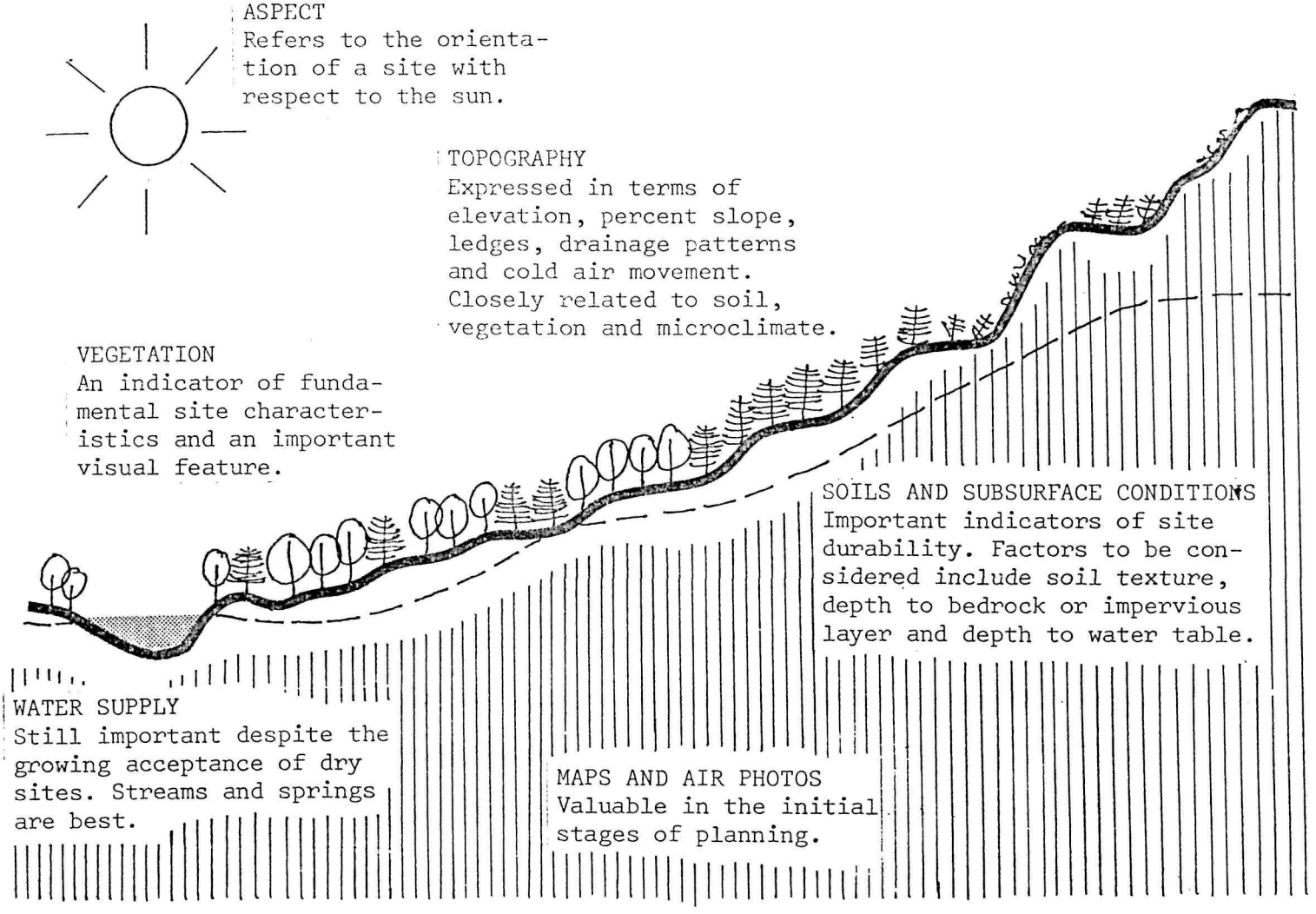

TABLE V: SUMMARY OF SITE SELECTION FACTORS

	Poor	Acceptable	Good
Soil	Fine, organic (clay, silt, muck)	Coarse (sands, gravels)	Medium (loam soils)
Subsurface Conditions Depth to bedrock, water table, or impervious layer	0 to 1 foot	1 to 5 feet	Over 5 feet
Topography			
Elevation	Above timber line	2,500 to 3,500 feet	Below 2,500 feet
Slope	Greater than 15%	10% to 15%	Less than 10%
Drainage	Drainage channel, depression		Convex landform
Aspect	North, northeast	West, northwest	East, south, southwest, southeast
Vegetation	Alpine vegetation, bog areas	Sub-alpine, spruce-fir forests	Deciduous forest
Water Supply	None	Lakes, ponds	Streams, springs

SITE DESIGN

Once the site has been selected, the next task is to position the facilities on the landscape. The main point to remember is that facilities should be located so that pathways are convenient and obvious, thereby limiting hiker impact to a relatively small area. A minimum of trails and clearly-designated "use zones" around each facility are a must.

The first step in designing an area is to know your site. Walk it up, down, across, and back--be familiar with every square foot. Chances are, by the time you finish you may already have an idea of where facilities might go.

At this point, some people sit down with pencil, paper, and compass and sketch a crude site map. The process then becomes one of positioning facilities on the map, locating them on the ground, and returning to the drawing board to make modifications. Others complete this stage in their heads. In either case, however, there are some general guidelines that may be applied.

LINEAR LAYOUT

The linear layout of shelter site facilities has proven a successful means to minimize the "area of disturbance", or the visible effects of trampling (Fig. 4). The idea is to keep the number of pathways within a site to a minimum. With good forethought, this can be a single path walkway. The tendency to shortcut between the shelter and the privy, the privy and the water supply, etc., is eliminated because the shortest (most attrac-

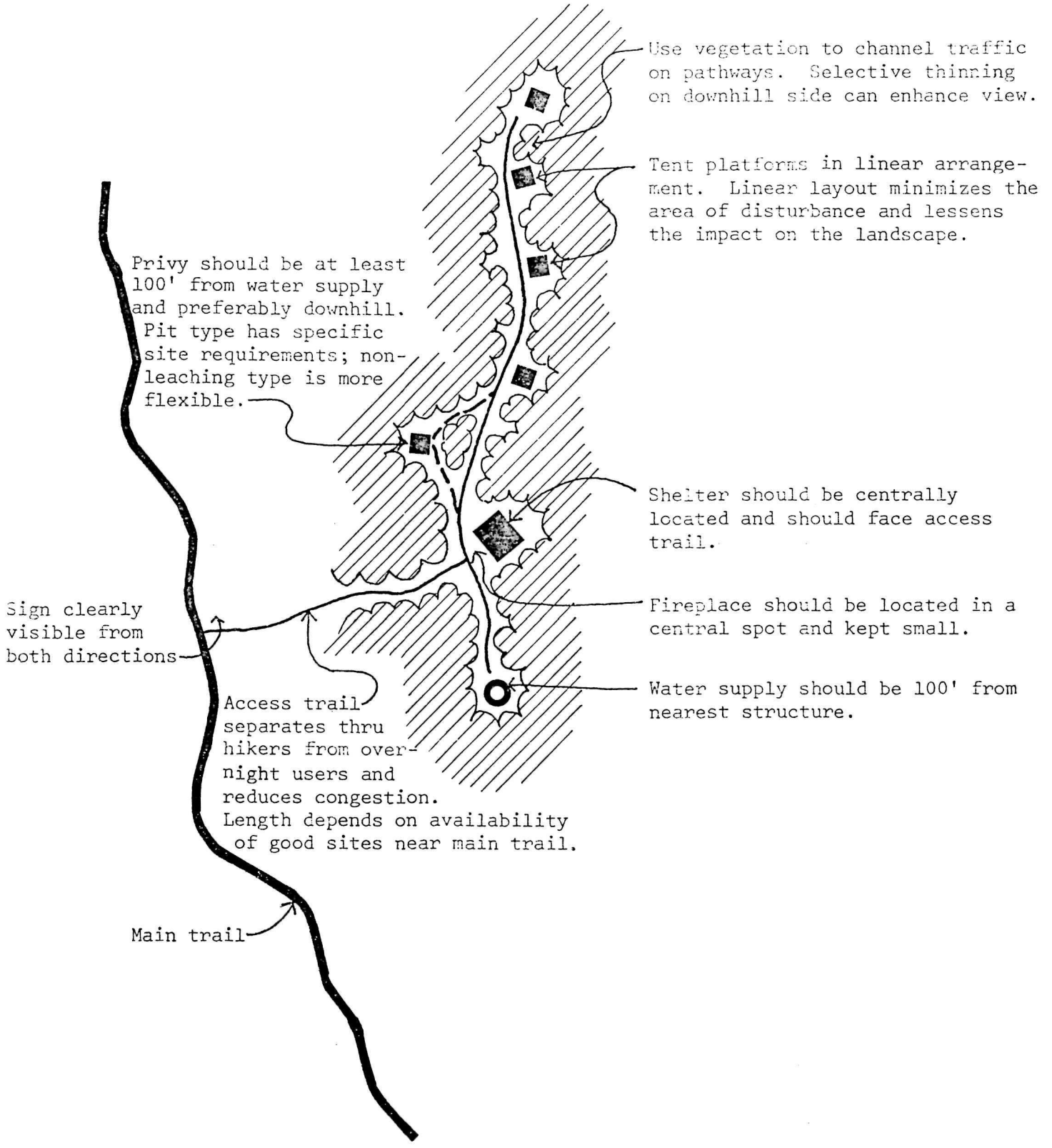

FIGURE 4. Linear Layout of a Backcountry Overnight Area.

tive) route between any two points is the single, designated trail. This is in contrast to sites laid out like a wheel, with a shelter as the hub, and the spokes as paths leading to the water, toilet, and main trail. Usually, a site like this undergoes considerable trampling.

There is no set guideline on the best distance to have between the shelter facilities of an overnight site. Individual tent platforms that you want to locate for plenty of solitude should be separated by a wide corridor of vegetation, probably at least 50 feet. If they are laid out too close together, people are camping almost on top of each other (Fig. 5). A number of tent platforms close to one another, though, can be good for group camping. In fact, it is not a bad idea to have one cluster of platforms near the end of your linear layout to take care of a large, possibly noisy, group.

ACCESS

Experience has shown that shelter sites located off the main trail, reached by a side trail, are the most desirable. They reduce the congestion sometimes created by two hikers, and may reduce the amount of soil compaction near the site.

The access trail may be long, as in the case where low elevation sites are constructed to serve a ridge trail; or short, when good site conditions are found in close proximity to the main trail.

In either case, layout and construction of the trail should be given careful consideration; so should signing for the access. A site may be ideal, but poor access or an unmarked trail can render it nearly useless.

A final note on the access trail is its entry to the shelter area. Because people have a natural tendency to want to survey the situation before becoming part of it, it is a good idea to have the access trail

FIG. 5. Tent Platforms Too Close for Good Linear Layout. Note the complete absence of visual screening that could separate sites. This design could be good, though, for use by a single group of 6-8 people.

lead into the front, or open, portion of the shelter or platform area. This way, visitors can assess how full a shelter is, what kind of group is there, and whether they want to spend the night.

PRIVY FACILITIES

In those situations where a common pit privy is to be used for waste disposal, rather than a non-leaching composting system, there are some guides to its location. Soil conditions pose some limitations as described in Tables I, II and III. Generally, there must be at least five feet of well-drained soil for a pit toilet, with a distance of at least two feet between the pit bottom and bedrock, an impervious soil layer (like clay or "hardpan"), or the water table. In addition, privies should be at least 50 feet from any building, and about 100 feet, at least, from the water supply; preferably, below where people draw drinking water.

When a non-leaching, composting privy is used, there are no site limitations other than that it should be located on a flat spot a convenient distance from the shelter, with visual screening provided.

VEGETATION

Vegetation may be used to advantage when designing a shelter site. Traffic can be channeled on pathways, for example, by leaving dense undergrowth or trees right along the edge of trail. This subtly encourages visitors to stay on the path by making it difficult or undesirable not to. It also helps ensure easy movement at night when the designated pathways will stand out against the darker forest edge. The same holds true for the

area around shelters. Clearing only the required amount of vegetation to make the area useful, and possibly indicating the boundary with logs or rocks can effectively confine traffic to a limited area.

There are some instances, too, where vegetation may be used to discourage use. For example, the thorny or dense shrubs often found growing on a lake shore may be left, rather than cleared, to discourage camping or walking directly on the shore. This helps preserve the visual qualities of the water feature, while avoiding compaction, erosion and loss of vegetation.

It is also useful to sometimes manage the view from a shelter. The judicial removal of a few trees can create a view, while leaving others helps "frame" the view.

FIREPLACES

Site deterioration problems at backcountry shelters are partially attributable to the practice of gathering firewood. As the supply of deadwood near a shelter is used up, people travel greater distances to find suitable firewood. Soil compaction occurs in the process, while the site's perimeter inevitably expands. Trees may be scarred and stripped of their lower branches.

To minimize these impacts, some trail maintenance groups have adopted policies to discourage wood fires, while encouraging the use of lightweight gas stoves. A small supply of firewood sometimes is kept on hand for those campers without stoves. Fires should be limited to a designated, permanent, centrally-located spot.

PERMANENT PHOTO-POINTS

A final task when laying out an overnight site is to establish one or several permanent photo-points. From these points photographs can be taken at year, to several-year intervals which depict site features in identical orientation. Therefore, photo-points serve as a monitoring system, since changes can be quickly noted by comparing photographs taken in succeeding years. Over time, photo-point information becomes a key for identifying which sites are most durable under known levels of recreational use.

Site photos can be interpreted to yield a variety of information. Deterioration of manmade structures, tree removal, loss of groundcover, expansion of compacted or eroded areas, and changes in vegetative "screening" are a few of the kinds of information photographs reveal.

Photo-points are usually established using a compass and tape. Bearings and distances from the photo-point to three stable witness objects (large trees or rocks) are recorded. Sometimes, small bolts drilled into rock, or redwood stakes driven flush with the ground are used as reference points. Overlapping photographs are then taken from a level tripod. After developing, prints are mounted as a 360° mosaic. Color film, although more expensive, provides greater detail than black and white film. A separate guideline is planned which will discuss photo-point inventories in greater detail.

APPENDIX

POSSIBLE GUIDELINE TOPICS

GUIDELINES FOR SHELTER SITE LOCATION AND DESIGN

GUIDELINES FOR CONSTRUCING BACKCOUNTRY OVERNIGHT FACILITIES

GUIDELINES FOR PHOTO-POINT INVENTORY OF OVERNIGHT FACILITIES

GUIDELINES FOR BACKCOUNTRY HUMAN WASTE DISPOSAL

GUIDELINES FOR REVEGETATION OF SHELTER SITES, TENTSITES, AND MOUNTAINTOPS

GUIDELINES FOR USE OF SIGNS ALONG TRAIL/SHELTER SYSTEMS

GUIDELINES FOR ESTIMATING RECREATIONAL USE WITH TRAFFIC-COUNTING DEVICES

GUIDELINES TO TRAIL AND SHELTER INVENTORY METHODS

GUIDELINES FOR USE AND ADMINISTRATION OF CARETAKERS, RIDGERUNNERS AND RANGERS