Judging Recreation Impacts on Wilderness Campsites

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ABSTRACT—A simple, easily applied condition classification is presented as an aid in the inventory and management of campsites.

Man-caused changes in wilderness areas are particularly obvious at campsites where visitors concentrate. In areas of outstanding fishing success or striking scenic appeal, or even in unspectacular locations an easy day’s hike from a road end, intensive use often causes noticeable and severe changes in the physical and biological character of the sites.

Managers responsible for minimizing such man-caused changes in wilderness have a difficult task. A complete inventory of existing campsites, showing the location and condition of each, is basic to the development of an intensive management program, but usually the sites are numerous, are in many different stages of change, and are widely scattered over remote terrain. Under such conditions, detailed mapping and measurements are often impracticable. More expeditious techniques are needed.

This paper describes a simple, easily applied classification scheme based on a rating of the degree of man-caused change a site has undergone.

Visual Criteria

Willard and Marr (1970) described a scale based on measured change in the percentages of plant cover, plant vitality, soil exposure, and erosion. However, little information was given on application of the method.

Merriam et al. (1973) also developed a set of “impact stages” for the Boundary Waters Canoe Area. Classification of sites into these stages requires the on-site measurement of the amount of bare soil, soil compaction, dead trees, trees with exposed roots, loss of ground vegetation, and growth in size of site. The classification was developed after study of changes on newly constructed campsites for which complete records of use and change were available. Such information is almost never available for wilderness campsites.

The condition classification presented here uses visual criteria, i.e., easily observable changes in site condition. Such criteria are justifiable from several points of view. First, the changes are noticeable to most visitors and may influence their perception of site “quality.” Second, these visual indicators signify less obvious changes—for example, increasing soil bulk density from compaction—and thus are integrating measures of more complex changes.

Patterns of Site Change

The framework for the classification was derived from observations made during research in the Boundary Waters Canoe Area of Minnesota and the Spanish Peaks Primitive Area in Montana. During these studies, a relatively constant pattern of site change was noted.

Under initial light use, typical effects are:
- Herbaceous vegetation trampled, with the degree of injury dependent on variations in plant moisture content, vigor, and size.
- Some trees removed for firewood.
- Rocks moved to construct a fireplace or ring.
- Charcoal added in fireplace area.
- If horses are used, some grazing and additional trampling occurs. Horse manure, possibly containing exotic seeds, is deposited along trails and around camp areas.
- Some nutrients added from human wastes.

The natural system will soon cancel out most of these changes if use does not recur (fig. 1).
With continued light use or moderately increased use, other changes are seen:

- Soil compaction occurs, the degree depending on soil texture, moisture, and amount of organic cover. It is particularly noticeable immediately adjacent to the fireplace. This compaction begins to affect movement of air and water into the soil.
- As compaction increases, infiltration of precipitation is reduced. Surface runoff carries away organic litter and humus.
- In dry weather hikers’ boots and horses’ hooves grind additional litter and organic matter into dust that is blown by the wind, washed away by runoff, or later carried off during wet weather as mud on campers’ feet.
- Erosion or removal of litter and humus exposes mineral soil. Rain drop impact rearranges the surface particles, further reducing permeability.
- Erosion eventually exposes tree and shrub roots, which are then susceptible to direct mechanical injury and drought.
- The total impact of trampling, erosion, soil compaction, and root damage destroys plant cover, particularly near the fireplace, along access trails, and on tent sites. The species composition shifts toward more “durable” plants and away from the natural community.
- Continued forage use by horses reduces presence of the preferred food species.

When recreational use is heavy and frequent, campsites become significantly modified (fig. 2):

- Soils throughout the site are severely compacted, except immediately adjacent to tree trunks and rocks.
- Soil movement is obvious. Many trees are surrounded by a fan of roots exposed on the surface (fig. 3).
- Ground cover is gone from most of the area. Remnants occur only in the most sheltered spots.
- Soil compaction and root exposure begin to affect vigor of the overstory vegetation. Dead and dying trees are evident. Loss is accelerated if horse use has been heavy and stock has been tied to trees in the campsite area.
- Meadows show increasing evidence of overgrazing. Bare spots begin to appear.
- Large parties have constructed several new fire-
place sites. Size of the camp has grown accordingly.

At this point ecological change has become readily visible, even to the most untrained eye. Visitors notice that the site is different from its surroundings. It has lost its "greenness." Few wildflowers are in evidence. Wood chips, gravel, dirt, and perhaps horse manure have replaced the grasses, herbs, and shrubs. The sites are dusty in dry weather and muddy in wet.

Application

This sequence of use-related site changes has been simplified into a set of condition classes, each with appropriate and easily visible indicators (table 1). Obviously the scheme is very general in nature. Nonetheless, it allows the resource manager to quickly classify many sites, compare conditions, and identify overused areas.

Actions needed will of course depend on the local management philosophy and the ecosystem involved. For illustrative purposes, however, a set of possible management actions has been suggested for sites within each condition class.

A wilderness ranger or patrolman can use the classification to rate all campsites in his or her patrol area. If management guides for each condition class are available (as illustrated in table 1), action can be taken immediately. For example, sites receiving considerable use but still in acceptable condition (classes 2 and 3) can be watched closely to insure maintenance of this status. If further change is noted (up to next higher class), the manager can encourage visitors to avoid these sites and use other more lightly impacted areas. Use of class 4 and 5 sites can be reduced, either subtly, by encouraging users to go elsewhere, or formally, by closure (fig. 4).

With minimal training of personnel and no specialized equipment or research, this classification scheme allows almost immediate progress toward preserving a lasting supply of high-quality wilderness campsites.

Table 1. Campsite condition classes and possible management actions.

<table>
<thead>
<tr>
<th>Condition class</th>
<th>Visible indicators</th>
<th>Management</th>
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<tbody>
<tr>
<td>1</td>
<td>Ground vegetation flattened but not permanently injured. Minimal physical change except for possibly a simple rock fireplace.</td>
<td>These sites are barely recognizable as camping areas. If not in situations known to be sensitive to use (e.g., wet or slump areas), no management action is necessary. Maintain current use level or allow increase if nearby sites must be closed.</td>
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<tr>
<td>2</td>
<td>Ground vegetation worn away around fireplace or center of activity.</td>
<td>Site change now apparent but still within acceptable limits. These areas are readily identified as campsites and will continue to attract use. Future use should be carefully monitored to detect adverse change.</td>
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<tr>
<td>3</td>
<td>Ground vegetation lost on most of the site, but humus and litter still present in all but a few areas.</td>
<td>This is a transitional condition. Considerable change in plant cover is evident but little sign of soil problems. The condition may be accepted as normal in areas of high attraction. However, modification of current use patterns and intensities may be needed to prevent further change.</td>
</tr>
<tr>
<td>4</td>
<td>Bare mineral soil widespread. Tree roots exposed on the surface.</td>
<td>Deterioration is accelerating. If current level and type of use continues, soil erosion, loss of tree cover, and esthetic degradation are likely. Withdraw use from these sites and allow recovery. Some artificial rehabilitation may be desirable to speed recovery. If site is improperly located, permanent closure should be considered. If site is reopened, insure that use patterns are adjusted to prevent reinjury.</td>
</tr>
<tr>
<td>5</td>
<td>Soil erosion obvious. Trees reduced in vigor or dead.</td>
<td>Natural recovery will be extremely slow. The sites should be closed permanently and alternate ones located. If the site is critical to the recreation pattern, extensive rehabilitation will be required to return it to acceptable condition.</td>
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Literature Cited


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