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Cover photo:

Student Conservation Association work groups and YACC crews work to re-establish native vegetation on backcountry sites where heavy use has forced temporary closure.

Research Turns Up Specific Methods For Backcountry Rehab Management

Editor's Note: Two detailed approaches to management, describing scientific responses to problems arising from increasing human use of wilderness have emerged from the Western and the Pacific Northwest Regions and are here excerpted with some paraphrasing and in some detail. By-lines identify the authors in each case, and directions for obtaining the papers in their entirety (including rationale, additional details and lit. cited) are given.

Human Impact Inventory and Backcountry Rehabilitation in Olympic NP: Research and Its Application, by Edward Schreiner and Bruce B. Moorhead. (This paper in its entirety, reprints of results, and a draft of a use manual, may be had by writing the authors at Olympic NP, 600 E. Park Ave., Port Angeles, WA 98362.)

Our purpose in this paper is to describe the human impact research in Olympic National Park and how we have applied this to management. We tried to design a system that could:

1. Provide a survey of backcountry impact over one million acres.
2. Be useful to non-research oriented people.
3. Allow evaluation and comparison of backcountry conditions in different areas of the park.
4. Quantify human impact so sites could be monitored with time.
5. Be useful as a basis for making decisions on site management.
6. Describe patterns between human impact and ecological factors.

The method chosen uses an 8x10 inch "key-sort" card with holes punched along the margins. This allows analysis with or without a computer. The idea was stimulated by the Code-A-Site system of Hendee and others (1976). Code-A-Site allows a survey of dispersed campsites in roaded areas although it also can be used in the backcountry. The Human Impact Inventory (HII) system of Olympic was intended for use in the backcountry and is mainly concerned with the measurement of human impact and ecological parameters.

The HII card includes sections for site description, human impact, vegetation, and management recommendations. Procedure is to make a map of the camp area showing trails, campsites, and prominent features and then to fill out one card for each site. The primary measure of impact is eight line intercepts radiating along points of the compass from the center of the campsite. The distance to the first plant is recorded for each line. The eight lines then are averaged to provide a mean radius from which the area of bare ground is computed based on a circle. The measurements are repeatable so that any large change in campsite bare area can be detected. Photographs of each campsite also are taken.

Results of our investigation show:

1. Impact generally increases as tree canopy cover increases.
2. Areas with an alder overstory are the most impact resistant of the forested communities in the park.
3. Areas with bedrock or large angular rocks near the surface are very sensitive to impact.
4. Our most sensitive forested areas are those with Pacific silver fir in the overstory canopy.
5. Impact in major camp areas varies from 15-3000 square meters of bare ground.

These results have helped us tremendously in determining ways of minimizing impact in the Olympic backcountry. We now consciously shift use to those areas where we know plant communities are the least sensitive to visitor use. In high elevation areas, for example, visitors are being guided toward the less sensitive grass or sedge dominated sites as opposed to those dominated by low shrubs.

An additional benefit to the work is that we are able to rank the conditions of all backcountry areas and can thus set priorities for rehabilitation projects. Initially we are attempting to restore all areas with greater than 800m² of bare ground.

Backcountry rehabilitation in Olympic has reached a stage where it could almost be called backcountry landscaped architecture. Once an area or site has been selected, we try to recreate as far as possible the original conditions of the site. In practice we attempt to advance the successional stage so that the



SAME TREATMENT, DIFFERENT RESULTS: These paired sets of before-and-after pictures, taken at Lunch Lake in Olympic NP at five year intervals, show continuing erosion (top) at a pink heather dominated site even after removal of the fire ring, but recovery at the sedge dominated

site (bottom) approximately 200 meters away. In both cases, fire ring removal was the only management change. The fact that the lakeside site continued to attract use, even after fire ring removal, indicates that additional changes in management will be required if that area is to be restored

recovery process is hurried along. We have had excellent results using Student Conservation Association work groups and YACC crews as labor.

An overall plan for the area in question will improve the success of the restoration effort. This plan should include a follow up check on the survival rate of the plants. In some cases, exotic plants invade the recovery area and may need to be eliminated. This has occurred in the Olympic where exotics already were present due to previous horse use.

The General rehabilitation procedures used:

1. Select the sites to be worked on.

2. Find alternate campsites or institute a quota if some are to be closed.

Often more campsites are present than are used at any given time. Thus, the maximum number of parties per night using an area should be determined in advance of the restoration.

3. For multiple social trails, make one good trail and eliminate the others, but be careful because each trail is present for a reason. Observation of use patterns is imperative before beginning restoration.

4. Determine the vegetation that would be present and select species for transplanting. Grasses, sedges, and mat forming plants transplant the easiest. Water all plants thoroughly one day in advance of moving them.

5. If a limited number of plants are available, take seeds, cuttings and divisions to a greenhouse or cold frame for propagation and plant them the following year.

6. Dig up the site to a minimum depth of 10 inches. Make certain the compacted layer is loosened.

7. Incorporate several inches of organic matter into the soil. Peat moss and conifer duff are good for acid soils, steer manure for more basic soils.

8. Some people make a general application of fertilizer along with the organic matter.

9. Move the plants into wet holes, adding more organic matter and fertilizer.

10. Add rocks and decomposing logs to provided microsites and to discourage further use of the site. These should be partially buried to prevent visitors from moving them.

11. Water the area, scatter native seeds, and cover with jute netting. Spread organic matter, duff and soil on top of the jute to help it decompose and to reduce visual impact.

12. Stake the jute to hold it in place.

13. Photograph the area and count the transplants by species. It is also worthwhile to record the number and kinds of seeds used.

Careful record keeping is essential to determine the success of different species and treatments. We use natural lines between rocks, trees, and logs to delineate plot boundaries. This eliminates the need for permanent markers and saves time. A sketch map is usually all that is needed to relocate the plots.

It also is important to provide for interpretation of the restoration projects. As a general rule, visitors should know what you are doing, why you are doing it,

Olympic Rehab (continued)

and the location of the restoration sites and alternate camp areas. Methods can include short signs, maps of the project, and samples of jute with an explanation in ranger stations and visitor centers. A more elaborate method, which we intend to try in the future, is to provide before and after photographs of the sites themselves. Ideally these will be taken from the same point where the sign will be placed.

Overall our efforts have been reasonably successful. Olympic's backcountry is in better condition now than it was six years ago at the start of the project. We have used research as an effective tool for establishing a management program.

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Three publications available through Schreiner at Olympic NP are "Investigative Methods for the Study of Site Response to Human Trampling,"

Schreiner (1975), 15 pp., presented at the Second Annual Research Biologists Conference, USDI/NPS/PNR; "Human Impact Studies in Olympic NP," Schreiner, E., and B.B. Moorhead (1976), in Proceedings; Terrestrial and Aquatic Ecosystems Symposium, Cheney, Wash., NW Scientific Assn.; and "Human Impact Inventory and Management in the Olympic NP Backcountry," Schreiner and Moorhead, (1979), pp. 203-212, in R. Ittner and others, editors, Conference Proceedings, Seattle, Wash., USFS/USDA and NPS/USDI, R-6-001-1979.

The authors would like to acknowledge the support of the Pacific Northwest Regional Science Office in getting this project started. They provided field assistance and cards to Olympic and support for the training of individuals at North Cascades and Mount Rainier where Human Impact Inventory is also in use. Reprints of our results and a draft of a use manual are available from the authors on request, 600 E. Park Ave., Port Angeles, WA 98362.