

# Annotated Bibliography of Publications for LAC Applications

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Workshop participants suggested that one worthwhile addition to the proceedings would be an annotated bibliography useful to a Limits of Acceptable Change practitioner. This bibliography, then, emphasizes articles and papers on the practical, as opposed to the conceptual side, of LAC process discussions. One could envision this as a minimum library on the LAC process. Because works included here should be easily accessible, master's theses, doctoral dissertations, and unpublished presentations at symposia and workshops are excluded. Some topics could potentially involve hundreds of citations (such as management actions or public involvement). We emphasized synthesis works as opposed to empirical papers reporting results of individual studies. We also recognize that many worthwhile contributions have been omitted. The emphasis is on the literature we were most familiar with. We have divided the material into five major sections: (1) handbooks on LAC-type processes; (2) recreation impacts; (3) indicators, monitoring, and standards; (4) management actions; and (5) public involvement.

## LAC-Type Processes

Graefe, A. R.; Kuss, F. R.; Vaske, J. J. 1990. Visitor impact management: the planning framework. Washington, DC: National Parks and Conservation Association. 105 p.

Visitor Impact Management (VIM) serves as one of the foundations of the National Park Service VERP system. This monograph describes the initial framework for VIM and provides an overall summary of visitor impact research. Readers would find it a useful description of the rationale for the various components of VIM.

Graham, R.; Lawrence, R., eds. 1989. Towards serving visitors and managing heritage resources: proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo. 520 p.

This proceedings contains several articles on basic principles and concepts for LAC processes. Several articles are specific to LAC, VIM, and Canadian approaches to visitor management. Sections on interpretation, trends in visitation, and monitoring are also included.

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National Park Service. 1997. The visitor experience and resource protection (VERP) framework: a handbook for planners and managers. Denver, CO: U.S. Department of the Interior, National Park Service, Denver Service Center. 103 p.

This handbook describes the VERP process in detail, providing many helpful hints on how best to implement the process.

Shelby, B.; Heberlein, T. A. 1986. Carrying capacity in recreation settings. Corvallis, OR: Oregon State University Press. 164 p.

This book looks at an approach to evaluating the relationship between amount of use and use limitation. It briefly describes a process (C-CAP) for determining carrying capacities based on social criteria.

Stankey, G. H.; Cole, D. N.; Lucas, R. C.; Petersen, M. E.; Frissell, S. S. 1985. The limits of acceptable change (LAC) system for wilderness planning. Gen. Tech. Rep. INT-176. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 37 p.

This report describes the LAC process step-by-step and illustrates it using a hypothetical wilderness example.

## Recreation Impacts

Cole, D. N. 1994. Wilderness threats matrix: a framework for assessing impacts. Res. Pap. INT-475. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 14 p.

A comprehensive framework for assessing threats to wilderness is represented as a matrix of potential threats and attributes of wilderness character. Cells in the matrix represent the impacts of threats on each attribute. The report describes potential applications of the matrix. This matrix can help planners, managers and researchers during the scoping process and to assess research and management priorities.

Hammit, W. E.; Cole, D. N. 1987. Wildland recreation: ecology and management. New York: John Wiley and Sons. 341 p.

This book describes the impacts of recreation on soil, vegetation, animals, and water. It relates recreation impacts to the environmental and use-related factors that influence impact. It also describes management approaches for dealing with impacts.

Knight, R. L.; Gutzwiller, K. J., eds. 1995. Wildlife and recreationists: coexistence through management and research. Washington, DC: Island Press. 372 p.

Research on the impacts of recreation on wildlife includes finding ways by which impacts can be mitigated without curtailing recreation use.

Kuss, F. R.; Graefe, A. R.; Vaske, J. J. 1990. Visitor impact management: a review of research. Washington, DC: National Parks and Conservation Association. 256 p

The literature concerning both biophysical and social impacts of recreational use is extensive. This publication summarizes hundreds of studies of impacts, and organizes findings into five key principles, linking recreational use with impact. Readers would find it a useful publication when confronting significant impact questions.

## Indicators, Standards, and Monitoring

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Cole, D. 1989. Wilderness campsite monitoring methods: a sourcebook. Gen. Tech. Rep INT-259. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 57 p.

This report summarizes and evaluates information on techniques that have been developed for monitoring campsites, particularly in backcountry and wilderness areas. The author seeks to identify limitations and weaknesses and to suggest useful approaches.

Cole, D. N. 1983. Assessing and monitoring backcountry trail conditions. Res. Pap. INT-303. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 10 p.

Application of three types of trail assessment techniques—replicable measurements, rapid surveys, and censuses—can provide useful information to backcountry managers.

Hollenhorst, S.; Gardner, L. 1994. The indicator performance estimate approach to determining acceptable wilderness conditions. *Environmental Management*. 18(6): 901-906.

One method overcomes two limitations of the LAC process by using of a modified importance-performance approach. The method, using indicator performance estimates (IPEs), results in two types of information for each indicator: (1) importance, or visitor opinion as to the degree of influence the indicator has on wilderness experience, and (2) performance, or the degree to which an indicator exceeds or is within visitor standards. The results for each indicator are presented graphically. This technique allows managers to more systematically and effectively utilize information routinely collected during the limits of acceptable change wilderness planning process.

Marion, J. L. 1991. Developing a natural resource inventory and monitoring program for visitor impacts on recreation sites: a procedural manual. Natural Resources Report NPS/NRVT/NRR-91/06 Denver, CO: U.S. Department of the Interior, National Park Service. 59 p.

Biophysical impacts resulting from recreation includes changes to vegetation, soil, water, and wildlife. This monograph focuses on developing an inventory and monitoring program assessing visitor impacts at recreation sites. It outlines the important components of a monitoring program.

Martin, S. R. 1990. A framework for monitoring experiential conditions In: Lime, D., ed. *Managing America's enduring wilderness resource*; 1989 September 11-17; Minneapolis, MN. St. Paul, MN: Minnesota Extension Service, and Minnesota Agricultural Experiment Station, University of Minnesota: 170-175.

Monitoring social and biophysical conditions is essential to ensuring not only quality visitor experiences, but also to ensure that resource quality meets objectives. The author provides a framework of the components of a monitoring plan that should serve as a useful guideline for backcountry managers.

Merigiano, L. 1990. Indicators to monitor wilderness conditions. In: Lime, D., ed. *Managing America's enduring wilderness resource*; 1989 September 11-17; Minneapolis, MN. St. Paul, MN: Minnesota Extension Service, and Minnesota Agricultural Experiment Station, University of Minnesota: 205-209.

What indicators would be useful to monitor when managing backcountry resources? This paper lists potential indicators and suggests the criteria by which to select indicators. Managers would find this article helpful when initiating an LAC process because it assists them in addressing one of the fundamental concerns that visitors and managers have.

Noss, R. F. 1990. Indicators for monitoring biodiversity: a hierarchical approach. *Conservation Biology*. 4(4): 355-364.

Three primary attributes of biodiversity—composition, structure, and function—are expanded into a nested hierarchy that incorporates elements of each attribute at four levels of organization: regional landscape, community-ecosystem, population-species, and genetic. The author recommends a general guideline to proceed from the top down, beginning with a coarse scale inventory of landscape pattern, vegetation, habitat structure, and species distributions, then overlaying data on stress levels to identify biologically significant areas at high risk of impoverishment. This paper serves as an example of how indicators are developed and applied.

Shelby, B.; Vaske, J. J.; Harris, R. 1988. User standards for ecological impacts at wilderness campsites. *Journal Leisure Research*. 20(3): 249-256.

Studies of social impacts of recreationists in wilderness settings provide a conceptual and methodological framework for analyzing norms for ecological impacts. Three normative characteristics—range of tolerable conditions, norm intensity, and norm crystallization—are measured quantitatively using data from the Mt. Jefferson Wilderness. The model could be applied to a wilderness setting.

Shelby, B.; Stankey, G. H.; Shindler, B. 1992. Defining wilderness quality: the role of standards in wilderness management—a workshop proceedings; 1990 April 10-11; Fort Collins, CO. PNW-GTR-305. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 114 p.

This proceedings represents the collective efforts of many wilderness managers and researchers to review the body of management and research experience with regard to standards. Together they assessed the current use of

standards, summarized and integrated what has been learned, capitalized on the diversity of this work, and developed ideas about directions for the future. This work is helpful to managers and researchers who want to identify indicators and standards that capture the important qualities of wilderness and recreation experiences.

Watson, A.; Cole, D.; Merigliano, L. 1992. LAC Indicators: An evaluation of progress and list of proposed indicators. Washington, DC: U.S. Department of Agriculture, Forest Service.

This paper briefly reviews and compares some desirable characteristics of indicators and list of indicators that have been proposed or adopted in LAC plans. The authors evaluate progress to date and identify three major problems in selecting LAC indicators. Indicators from dispersed backcountry and wild and scenic rivers, as well as from designated wilderness, are included.

Williams, D. R.; Roggenbuck, J. W.; Patterson, M. E.; Watson, A. E. 1992. The variability of user-based impact standards for wilderness management. *Forest Science*. 38(4): 738-756.

This report examines four sources of variation in user based social impact standards: occasion, wilderness area, encounter type, and respondent. Social impact standards can be generalized across wilderness areas and to a lesser degree across measurement occasions. Respondents appear to share a high level of sensitivity to encounters, but the task of assigning a numerical standard may be too abstract to be meaningful. This can be useful to provide guidelines to future researchers and managers to obtain user-based standards.

Yuan, S. B.; Maiorano, M.; Yuan, S. M.; Hoshide, G. T. 1995. Techniques and equipment for gathering visitor use data on recreation sites. Missoula, MT: Technology and Development Program, U.S. Department of Agriculture, Forest Service. 159 p.

Estimating recreational use levels has been a challenge to recreation managers that has tended to be ignored over the last 20 years. This monograph reviews techniques for estimating recreational use at developed sites. While the focus is on developed sites, a reader would gain useful ideas about important recreation use estimation principles.

## Management Actions

Cole, D. N.; Petersen, M. E.; Lucas, R. C. 1987. Managing wilderness recreation use: common problems and potential solutions. Gen. Tech. Rep. INT-230. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 60 p.

This report summarizes information on alternative management tactics available for dealing with common wilderness recreation problems. It is broken into two sections: the first deals with basic strategies for attacking problems; the second describes the nature of general problems resulting from recreational use of wilderness. This report was designed as a "troubleshooting" guide that managers can turn to when faced with problems.

Douchette, J. E.; Cole, D. N. 1993. Wilderness visitor education: information about alternative techniques. Gen. Tech. Rep. INT-295. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 37 p.

Educating visitors about appropriate techniques is an often recommended management action. This publication details the different education and information techniques available, providing a brief description of their use and effectiveness.

Manning, R. E. 1979. Strategies for managing recreational use of National Parks. *Parks*. 4(1): 13-15.

This paper presents a classification of strategies for managing recreational use of our National Parks. The value of the material lies not in the classification system as much as in the logical and comprehensive array of alternatives available to National Park managers to deal with the environmental and social impacts of expanding recreation use. The author draws five conclusions from this research and expands upon them to provide a comprehensive list of alternatives for managers.

Marion, J. L.; Roggenbuck, J. W.; Manning, R. E. 1993. Problems and practices in backcountry recreation management: a survey of National Park Service managers. NPS/NRVT/NNR-93/12. Denver, CO: U.S. Department of the Interior, National Park Service, Natural Resources Publication Office. 48 p.

Results of a survey of managers of backcountry areas managed by the National Park Service shows that various management actions have been taken to deal with recreation management programs. Included are managers' opinions about which actions are most effective.

McCool, S. F.; Christensen, N. A. 1996. Alleviating congestion in parks and recreation areas through direct management of visitor behavior In: Lime, D. W., ed. Congestion and crowding in the National Park System. St. Paul, MN: Minnesota Agricultural Experiment Station: 67-84.

The authors summarize research on "direct management" of visitors, which includes actions that regulate, rather than inform or educate visitors about appropriate behavior. The authors briefly discuss issues associated with identifying what is a direct management technique.

McCool, S. F.; Lime, D. W. 1989. Attitudes of visitors toward outdoor recreation management policy. Athens, GA: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station.

This summary of perceptions and attitudes visitors hold toward different types of management policy particularly looks at attitudes toward a variety of use limitation policies. Information on the acceptability of use limitation policies would be useful to managers determining appropriate strategies for managing use when standards are violated.

Peterson, G. L.; Lime, D. W. 1979. People and their behavior: a challenge for recreation management. *Journal of Forestry*. 77: 343-346.

Visitor management may be directed toward causes of behavior, factors influencing visitor decisions about appropriate behavior, or consequences of behavior. The authors provide this framework for understanding what actions may be appropriate or effective in dealing with visitor induced impacts.

Stankey, G. H.; Baden, J. 1977. Rationing wilderness recreation use: methods, problems, guidelines. Res. Pap. INT-192. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 20 p.

If use must be limited, it also often must be rationed if demand is higher than the use limit provides. This monograph discusses the costs, benefits, and consequences of alternative use rationing methods. It outlines who benefits and who loses with different techniques.

Vander Stoep, G. A.; Roggenbuck, J. W. 1996. Is your park being "loved to death?" Using communications and other indirect techniques to battle the park "love bug". Lime, D. W., ed. Congestion and crowding in the National Park System; St. Paul, MN: Minnesota Agricultural Experiment Station: 85-132.

Information and education are forms of persuasive communications. Understanding the fundamental premises of different approaches to information and education helps managers select effective strategies. The authors present several models of persuasive communications and detail the implications for management of congestion in front and backcountry situations.

Wang, T. L.; Anderson, D. H.; Lime, D. W. 1997. A decision-making framework to maintain desired resource and social conditions in recreational settings. St. Paul, MN: The Cooperative Park Studies Unit, University of Minnesota. 236 p.

Often, recreation management techniques are chosen more for their intuitive appeal than following a studied examination of costs and consequences. These authors provide a framework for understanding selection of specific management actions as well as the acceptability of biophysical and social conditions. The work is useful as a listing and examination of what techniques might be appropriate.

## Public Involvement

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McCool, S. F.; Ashor, J. L. 1984. Politics and rivers: creating effective citizen involvement in management decisions. In: National River Recreation Symposium; 1984 October 31-November 4; Baton Rouge, LA. Baton Rouge, LA: Louisiana State University: 136-151.

Public participation has often been a component of Limits of Acceptable Change. This partnership was first initiated in the early 1980's in the Bob Marshall Wilderness Complex. The authors compare perceptions of citizens involved in this planning process with one based on traditional methods of public participation. Implications for river recreation planning are presented along with guidelines for organizing citizen task forces.

McCoy, L.; Krumpke, E. E.; Allen, S. 1995. Limits of acceptable change planning—evaluating implementation by the U.S. Forest Service. *International Journal of Wilderness*. 1(2): 18-22.

In a study of the effectiveness of LAC-based planning as it has been implemented by the Forest Service, LAC is completed more thoroughly and there is greater public satisfaction with the process when the public is intimately involved.

Moore, S. A. Defining successful environmental dispute resolution: Case studies from public land planning in the United States and Canada. *Environmental Impact Assessment Review*. 16: 151-169.

What makes for a successful resolution of a dispute? A comparative analysis of public participation in protected area management including the Bob Marshall Wilderness, shows that success is multidimensional—that is, not only is plan implementation an important measure, but such dimensions as learning, interest group representation, and relationships among participating groups are also important.