NOTE ON SOURCES:

The primary sources used in this analysis are the planning and environmental documents for these parks located in the NEPA Library at Northwestern University. These documents include STATEMENTS FOR MANAGEMENT, MASTER PLANS, and GENERAL MANAGEMENT PLANS, INTERPRETIVE PROSPECTUSES and STATEMENTS FOR INTERPRETATION, WILDERNESS REPORTS, just completed RESOURCE MANAGEMENT PLANS, as well as ENVIRONMENTAL IMPACT STATEMENTS and ENVIRONMENTAL ASSESSMENTS prepared for activities in these parks.

Background information on Woodland Indians was gathered from standard library sources. A useful introduction to the INDIANS OF THE GREAT LAKES AREA is a twenty-five page leaflet of that title prepared and distributed by the Bureau of Indian Affairs. The paperback book by Robert E. Ritzenthaler and Pat Ritzenthaler, THE WOODLAND INDIANS OF THE WESTERN GREAT LAKES (New York, American Museum Science Books, 1970) is a particularly valuable and interesting overview of what is known about the Great Lakes Woodland Indians.

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## CARRYING CAPACITY

### In Great Lakes National Parks

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Carrying capacity is the level of use beyond which impacts exceed acceptable levels specified by evaluative standards. Carrying capacity identifies a number for one parameter, use level. It assumes a fixed and known relationship between use level and impact parameters, and the capacity will change if other management parameters alter that relationship. It also will change if management objectives are altered or user populations change radically. Carrying capacity determinations require objective measures of the impacts of management alternatives which are distinct from evaluations of those impacts.

There are really four types of recreational carrying capacity depending on the nature of the most limiting impact. *Physical capacity* deals with space parameters, such as the capacity of a hot springs for soaking. *Facilities capacity* refers to man made or institutional elements such as parking lot size, marina dock space, or park staff. *Ecological capacity* refers to user impacts on some aspect of the biological or physical environment, water quality, site erosion, or flora or fauna availability and distribution, and *Social capacity* refers to the impacts of other humans on the visitor's recreational experience, such as encounters with other visitors doing the same or differing activities. A capacity is exceeded when

the impact exceeds agreed-upon levels. Sometimes everyone agrees about how much impact is too much; other times they do not. This lack of shared agreement is what makes carrying capacity subject to so much debate and discussion.

Physical capacity seldom is the limiting factor at Great Lakes region parks, but it often is a convenient place to start from as a maximum. How many boats could be on the St. Croix river gunwale to gunwale, bow to stern at the same time? Clearly far more than current use level, and more than anyone would care to see. Given reasonable assumptions about the appropriate swing length for anchor ropes (such as the standard that boats ought not touch with $90^{o}$ windshifts) it is possible that some Apostle Island mooring sites occasionally are approaching physical capacity for certain wind conditions.

Facilities capacity usually is expandable if demand is consistently great, so it is not generally an absolute limiting factor. Often the size of parking lots or the capacity of the Park Service boat to Isle Royale is used as a mechanism for maintaining a certain number of visitors (use level) to avoid exceeding a social or ecological threshold. Usually people agree about the capacities of facilities. One car per parking space, and one family per camp site are commonly accepted norms, so that those turned away because the facilities are full seldom complain about the criteria for denying access.

Ecological capacity has been the mainstay of the parks — the element that managers and interest groups will defend to the last. If visitor numbers were affecting the wolf-moose relationship at Isle Royale, there is no doubt that visitor numbers or distribution would be changed. If a given number of sail boats measurably and consistently reduced water quality in mooring sites at the Apostle Islands this would be justification for limiting the number of boats. If water quality impacts of motors could be demonstrated on the Colorado River in the Grand Canyon, I am quite sure there would be no motorized rafts. While ecological capacity may sometimes be a real issue, most often it is a red herring. Managers and concerned citizens allow visitor numbers to exceed reasonable levels as they seek elusive biological impacts. This misses the point that visitor numbers *in and of themselves* have a social impact, and some of these may exceed the generally accepted standards. The quest for a social carrying capacity is to determine these standards.

The parks always have been in the business of providing recreational experiences, and recreational experiences have definite *social* capacities. Tennis, for example, has rules, one on a side for singles, and two for doubles. But five people can't play tennis at the same time. The rules are looser in volley ball. While it is officially 6 on a side, backyard games have from three to ten on a side. But you can't play volleyball with one on a side or thirty on a side. Social capacity for volleyball has a range rather

than a specific number.

What needs to be done for each Great Lakes region park is simply list the kinds of recreation experiences that are being provided...pleasure sailing and boating, island camping, overnight mooring, and racing at the Apostle Islands; wilderness backpacking, overnight mooring, lodge vacations at Isle Royale; and so on...and then to come up with rules for the appropriate number of contacts with others. These rules should note both the preferred (optimal) and tolerable (satisfactory) number of contacts. In some cases this is well worked out from other research. Back country visitors prefer one contact per day on trails, and solitude when camping. They will tolerate up to 4 or 5 trail contacts per day on trails, but not more than one night in five camping in sight of others. In other cases the rules need to be developed. What is the appropriate beach encounter at Indiana Dunes, automobile encounters at the drive-around-park of Sleeping Bear Dunes? What is the range and how important is the number of people for the experience? Are these considerations vital as in tennis, or largely irrelevant as in watching a sunset? Rough enumerations and answers to these questions can be elicited from any knowledgable group of recreationists.

Of course there are many complications. One deals with heterogeneity. What if half the people want to play tennis, and the other half wish to play volleyball on the same court...two activities that have two separate social capacities? There is no social capacity for a combined game of tennis/volleyball. Many of the conflicts about capacity arise from two groups of people trying to participate in two different activities at the same time and place. A river has one capacity for trout fishing and another for tubing. Sometimes the activities look similar — social camping vs. wilderness camping. For one, an important goal is to meet other people — or at least to feel secure by seeing similar people around; for the other, the goal is to escape from other people, hence, two separate social capacities. A singles beach vs. a wilderness beach presents a similar problem. In one case, more is better, in the other more is worse.

One needs to identify the types of activities having different capacities, or styles within a certain activity (camping, fishing, beach going), which have differing requirements, and find ways of keeping them separate in time or space. Without such separation a social carrying capacity is not possible.

Information and opportunity can play an important role in solving social capacity problems in Great Lakes parks. People do not like playing tennis and volleyball in the same space. They will, if given an opportunity, go to two separate places. Simply put, social capacity problems can be avoided if managers give people different opportunities. Opportunities for high and low density hiking, camping, sailing, canoeing and beach use are necessary. These can be provided through regulation, such as permit systems,

or through structuring, such as making some places more difficult to reach than others. To provide the exact same experience for everyone in the name of equity is, in most cases, to satisfy no one.

Visitors also need information to achieve effectively their own density dependent objectives. They need to know what they can expect in terms of encounters with other visitors if they go to certain locations at certain times. Those willing to tolerate high use levels will self select accordingly. Those who prefer lower levels will have more accurate expectations. Our research shows that seeing more than you EXPECT has much to do with how crowded people feel. So if visitors have appropriate expectations, there will be a less negative impact from numbers of people on their evaluation of the recreation experience. Even if a manager can do nothing to limit use, visitors can be informed that use level on a given day is twice or three times the social carrying capacity.

What needs to be done in Great Lakes region parks to establish social carrying capacity as a legitimate concept and to encourage capacity management is to 1) identify the types and styles of recreation experiences provided in each park, 2) make judgments about the preferred and tolerable number or range of contacts for each, 3) identify inconsistent activities that presently are mixed, 4) suggest ways of separating these activities and 5) develop mechanisms for providing information or feedback to visitors. None of these objectives, themselves, necessarily require extensive research or data collection.

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## THE ROLE OF SCIENCE

### In The Great Lakes National Parks

*Mark Reshkin*

#### Science: An Unsure Role

The role of Science in the National Park Service has undergone many changes since 1916 when the nation formalized its commitment to both preserve and yet make available for enjoyment our most significant natural areas.[1] Scientists perform two functions in this endeavor; provision of an understanding of these natural resources including their functioning and extent, and recommendations for management such that these natural riches persist for the enjoyment of future generations of visitors.

For the most part the role of science has been reactive to the changes that have occurred in NPS natural resource management