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VISITATION BEHAVIOR PATTERNS
AND CARRYING CAPACITIES IN
THE GREAT SMOKY MOUNTAINS NATIONAL PARK

Patrick Roland Renau

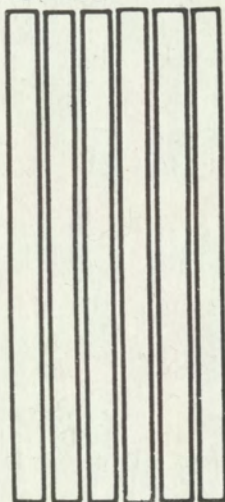
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VISITATION BEHAVIOR PATTERNS
AND CARRYING CAPACITIES IN
THE GREAT SMOKY MOUNTAINS NATIONAL PARK

A Thesis

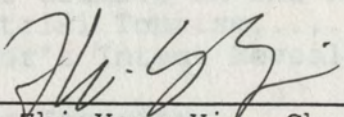
Presented in Partial Fulfillment of Requirements for the
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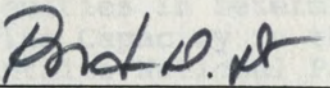
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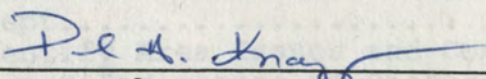
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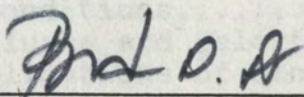
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"The crowd diminishes
according to the square of the distance from the highway
and according to the cube of the elevation above it."

-David Brower (1971)

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INTRODUCTION

Anthologic Distinction of Problem

There is an unavoidable danger involved in selecting a thesis topic with high degrees of relativity, in that a personal persuasive element inherently subsumes much of both the initial intent and perhaps, if the results dictate, a concluding message. This study walks that line without alienating standard thesis objectives and criteria.

Human behavior in itself is a difficult paradigm. Over the centuries reams of laws and statutes in various cultures have attempted to moralize the human response toward the natural environment. The behavioral characteristic mechanisms of production, contemplation and destruction inclusively presents the problem at hand: the preservation (protected or limited use) of remaining tracts of wild lands or the

conservation (managed or multiple use) of those same areas. The conservationist is an economically compromising constituent that views preservationism as extremely anti-anthropocentric and unrealistic in today's expanding society.

Yet Sax (1980) saw the preservationist not as an elitist who wants to exclude others, but as a moralist who prefers to convert, or educate, them. *almost a half century earlier,*

The problem of whether to preserve or conserve is compounded by a constant evolution of attitude perceptions toward nature in relation to the social and economic migration of the populace. Shepard (1967) categorized the tourist who drives through six national parks and six thousand miles in a 2-week vacation as belonging to the main tradition of a century of public travel. He concluded that, oddly, the hurried tourist seems to have trouble filling the day, or 'keeping busy,' that he has been a kind of "boob in the moonshine of travel, the sucker of the open road, taken seriously only by those bent on fleecing him."

Sax (1980) assessed tourism in the national parks as little more than extension of the city and its lifestyle transposed onto a scenic background. He cited an example in the Great Smoky Mountains whereas at one time areas along the roadways were neatly cut resembling a lawnlike appearance. A newly appointed superintendent halted this practice explaining that visitors were reacting to a conventional and familiar

image of beauty: the trimmed and landscaped lawn. He did not want to stimulate this familiar response, but to confront the visitor with the less familiar setting of an unmanaged natural landscape. The mild shock of a scene to which there is no patterned reaction is precisely what national park management should seek, even in such seemingly small details.

Henry Ward (1938), almost a half century earlier, supported Sax's example reporting that the roadsides at Grand Canyon had been graded eliminating natural growth, that walkways had been constructed with the effect of introducing an element of the artificial, of the smooth and conventional, into what is, perhaps the supreme primeval landscape of the entire world. After blasting Yosemite Valley as the worst example of all (dance halls, movies, bear pit shows, swimming pools, studios and barbecues), his conclusion was that "such diversions were not bad in themselves, simply that none had any relation whatever to the purpose for which the national parks were established." (emphasis added)

Runte (1987) went further to suggest that each time preservationists singled out the agent primarily responsible for overdevelopment of the national parks, they inevitably debated the impact of the automobile. The "Mission 66" program that was implemented by Congress in 1956 complicated the problem of finding a balance between preservation and use of the national parks. The ten-year program was to expand

rather than reduce the carrying capacity of the parks by reconstructing roads, adding visitor centers, and increasing overnight accommodations. Plans called for facilities sufficient to handle the estimated eighty million auto vacationers expected to crowd the reserves during the golden anniversary of the National Park Service in 1966. Between 1955 and 1974 visitation more than tripled, from approximately fourteen million to forty-six million in the national parks alone. Use of the national monuments rose proportionally, from roughly five million to more than seventeen (Runte, 1987).

Thus American society over time has modified the definitions of "nature" and "wilderness" through its escalation of recreational desires. The fast food, drive-thru mentality has followed the consumer into the hills. The Great Smoky Mountains National Park is a prime example.

Objectives of Study

This study will conduct an analysis of tourist visitation patterns in the Great Smoky Mountains National Park. By examining this data with tourist behavior expectations, alternatives could be drawn to determine whether the park's resources should be viewed in either a more preservative aspect or to develop better "use" formulas and strategies for

increasing popularity. For example, if preservation is developed as an alternative, would closing or restricting use of the transmountain highway be a viable option? Or if data shows the visitor wants more access into the park, how does that affect surrounding ecosystems based on current status? To which user was the park established for? And what events dictate changes in priorities from both a sociologic and ecologic premise? In short, the question of preservation being a primary or secondary choice for this biosphere is the impetus for this study.

In an attempt to answer these questions the following objectives were set for this project:

1. Identify the problem: Overuse in certain areas of a national park that is breaking down resources in its core reserves. Proliferating the damage is the economic leaching of surrounding communities that distract and distort the concept of recreation.
2. Gather data: Investigate statistical trends, current perceptions, and physical evidence in forming a basis for the problem.
3. Compare results of data: Use past studies, apply the findings to a macro scale, look for 'cause and effect' relationships.
4. Offer alternatives: Does the problem need alleviating or eliminating? Is the problem interfering with goals and objectives? What options are available?

Description of Study Area

The Great Smoky Mountains National Park (GSMNP) covers 800 square miles, straddling the Tennessee-North Carolina border.

The Park is noted for its high elevation (sixteen peaks in excess of 6000 ft.) and steep valleys, the lowest elevation being 400 feet. With these elevation variances and abundant annual precipitation, the Park has a striking variety of plant and animal life. There are approximately 1300 native species of vascular plants and 130 native tree species (Peine and Renfro, 1988). Within six major forest types, eight tree species reach a world record height in this favorable growth environment. The range of ecosystems spans the spruce-fir system, representative of Canada, to the yellow pine-hardwood, which is indicative of the Southern Piedmont regions. The Park provides a habitat for hundreds of bird species, numerous reptilian and amphibian species, and well over 50 species of mammals the most famous of which is the black bear, approximately 300 of which are said to reside within the Park boundaries. Since 1973, the Park has been designated an International Biosphere Reserve and since 1983, a World Heritage Site.

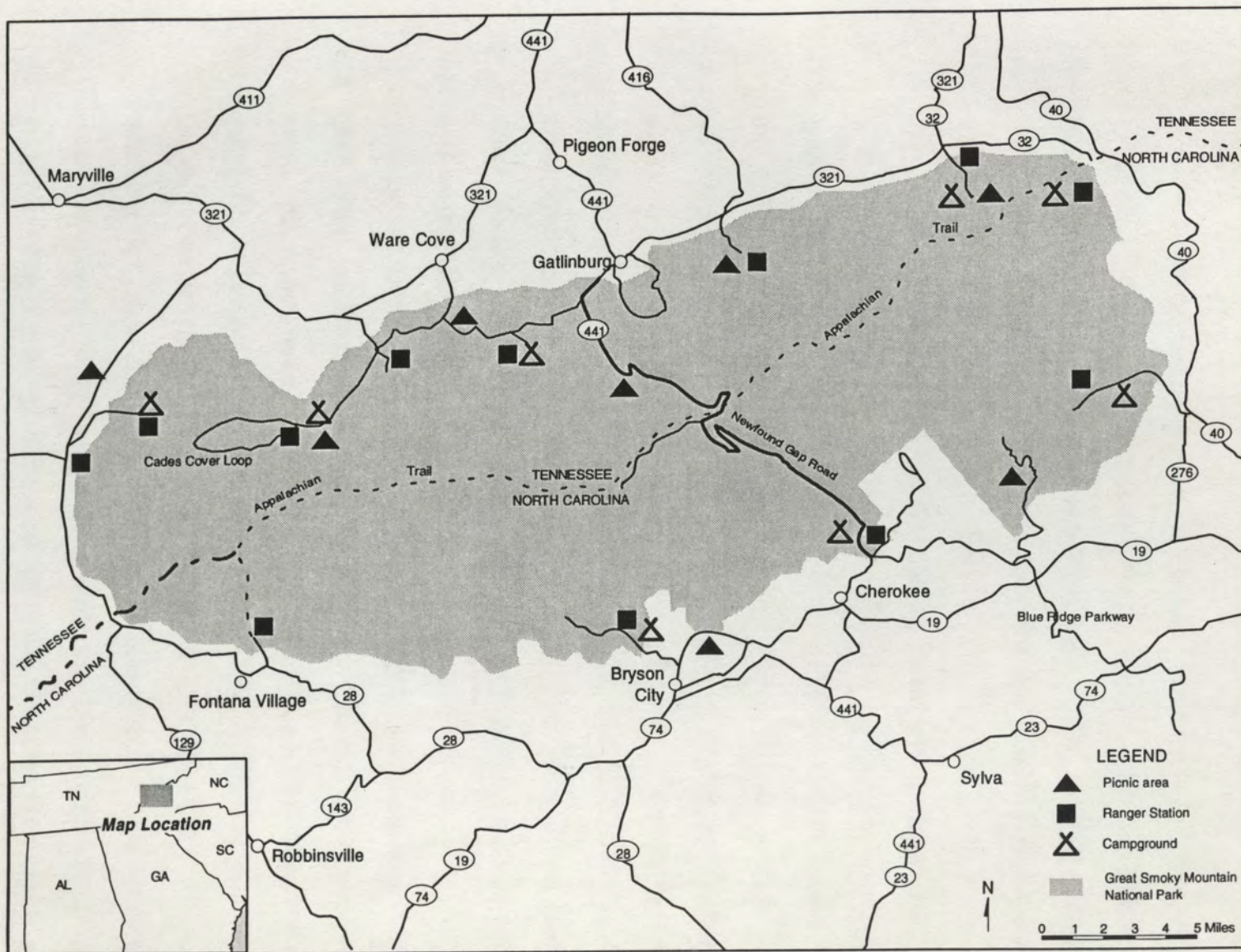
There are 18 visitor entrances to the Park, 28 watersheds, 732 miles of rivers and streams, 346 miles of scenic roadways, 1024 front country campsites in 10 locations, 9 picnic

grounds, 953 miles of hiking and horse trails (69 miles are along the scenic Appalachian Trail), 82 backcountry campsites, 18 backcountry shelters, 5 horse camps, 70 historic structures, 3 visitor centers, and over 100 weekly interpretive programs offered in the summer season (Peine and Renfro, 1988).

The proximity of the Park to major urban population concentrations create its overwhelming popularity and contributes to summer overcrowding. American Hiker (September issue, 1990) attributed this problem to the imbalance between recreation and wilderness land distribution (mostly in the West) and the population distribution (mostly in the East). Of the 690 million acres of federal recreation land, 95 percent is located in the West.

The major vehicular access points to the Park are the centers of most of the intensive visitor use. These access areas are the Gatlinburg-Pigeon Forge, Tennessee locales and the Cherokee, North Carolina southern entrance. Connecting these two points is the transmountain highway (US 441). Numerous peripheral and partial access entries can be found throughout the perimeter of the Park interior (Figure 1). One of these peripheral access points is Cades Cove, a popular destination to see century-old homesteads and scenic valley views. As early as 1975, studies were being conducted to evaluate visitor vehicle flow in the Cades Cove area. Even

Figure 1: GSMNP Boundaries and Connecting Road Access
 (source: Park Headquarters Map-Information Brochure)



then, nearly 1500 vehicles were using the Cades Cove loop access on peak days causing the Park Service to consider a mass transit system for this area (Devine, 1975). The transit system was never built though the vehicular traffic continued to increase.

The Great Smoky Mountains National Park was unique in its origin of development. Creation of the eighteen national parks prior to 1924 was accomplished by setting aside lands which already belonged to the federal government. But the "Great Smokies" constituted 515,225.8 acres held in private ownership, in more than 6,000 separate tracts. Approximately one-third of this area was still primeval forest. Worst of all, from the land-buying standpoint, was the fact that there were over 5,000 lots and summer homes contained within this region (Campbell, 1960).

It wasn't until November 1940, almost two decades since the idea was conceived, that the final tract of land was purchased to complete the present-day park boundaries. Inscribed on a large bronze plaque placed at Newfound Gap were the words: FOR THE PERMANENT ENJOYMENT OF THE PEOPLE.

Considering the history of local ownership, the current proximity to large population centers in the Southeast, and the initial intent for public use of the Smokies (as with all federal parks), there is a tremendous task awaiting anyone who proposes altering access or defining types of use in the area.

When unforeseen conditions develop over an extended period of time, there should be room for implementing proper modifications in reprioritizing natural resource values. During this process it may become apparent that modification and compromise may not be enough to sustain resources for the long term. The problems facing the Great Smokies may call for more than moderate suggestions to preserve how the Park should be "enjoyed" for future generations.

Problem Presentation

The concern in general is that there are too many people in the National Parks at a given time, spending only hours when they should be spending days, learning to appreciate and understand the natural systems and in the process learning to understand themselves. In addition, The Great Smoky Mountains National Park introduces and accurately represents negative externalities associated with surrounding amusement distractions influencing the brevity of visits to the Park and even contributing to visitation intent. This "Industrial Tourism" development along with a burgeoning summer traffic problem should dictate a re-evaluation of park use and access, if needed, to protect the integrity of its resources.

While the number of visits to all Federal recreation areas increased by about 30 percent from 1977 to 1987, the total

amount of time people spent in these areas has increased by only 4 percent (Hinds, 1990). Since 1987, the Great Smokies has experienced an even greater shift toward shorter visitor duration. Peine and Renfro (1988) found that the majority of daily visitors see the park through their car windshield, averaging only 1.7 stops per visit with 27 minutes the average amount of time per stop. Ahloa and Weissinger (1980) suggested that these short visits could result from "Leisure Boredom", a direct reflection of an individual tendency or situational factor, in that boredom on a broad scale was related to job dissatisfaction.

During summer, the motorized Smoky Mountain visitors are funnelled through a two-lane, north-south highway that bisects the park. Additionally, several spur roads hug the perimeter where established campgrounds provide overnight use opportunities. Though the total annual visits of the park far exceed those of any other national park, a study shows that *only one in six visitors gets out of their car* (Peine and Renfro, 1988). By late afternoon many of these thousands of daily travelers have gravitated to the outlet malls and entertainment centers of Cherokee, North Carolina; Gatlinburg and Pigeon Forge, Tennessee (home of retired "Hee Haw" spectacles and "Haunted Golf and Video Arcade").

Officially, Park Headquarters would like visitors to stay longer and see more of the park (Trout, 1993). The

construction of "quiet walkways" was designed to coax visitors out of their vehicles. Unofficially, there are those within the park staff who philosophize in the efficiency of hording the masses through 10 percent of the park while "preserving" the remaining 90 percent. Problems arise with both scenarios though: If you manage to get a significant portion of visitors to stay longer, especially at current attendance levels, carrying capacities become strained on an even grander scale. Likewise, the present situation creates problems of litter, crime and air pollution.

The National Park Service (NPS) has identified 1750 major problems affecting 200 parks. About 20 percent of the threats to the parks are posed by commercial activities such as strip mining, logging and oil drilling that are permitted on adjacent lands managed by other Federal agencies (Hinds, 1990). The threats from other agencies come from their perception that the National Environmental Policy Act (NEPA) is a device used to allow local governments to interact with federal officials on projects designed for their areas. Frequently state planners and county commissioners first learn about a project's scope and impact when they receive the early notice for the scoping session required by the NEPA regulations. An example in Georgia occurred when the first concrete information the local planning agency received about the Kings Bay Trident Submarine Base, planned for St. Mary's

County adjacent to Cumberland Island National Seashore, came in the form of informal notices required by NEPA. The notices triggered local government planning to deal with the impacts of the base (Simon, 1988). Wolke (1991) echoed the sentiment that laws such as the National Environmental Policy Act were designed to accommodate industrial development, not prevent. The NEPA, he stated, is "largely a procedural law; as long as proper procedures are followed, agencies can legally proceed with destructive projects."

A NPS report (Carpenter, 1982) in 1980 stated that 50 percent of reported threats were attributed to sources located external to parks. Runte (1987) added that often loggers in Pacific states clearcut the adjacent forests right up to the park boundaries, thus subjecting hundreds of great trees which supposedly had been "saved" to the threat of being undermined by flash floods and mudslides from the logging sites.

The importance of "integral vistas", and to a greater extent, the idea of complete wildlife corridors or buffer zones around the parks is amplified by the logging threats alone. An integral vista is defined as a view perceived from within the mandatory Class I Federal area (greater than six thousand acres) of a specific landmark or panorama located outside the boundary of the mandatory Class I Federal area (Simon, 1988). The Environmental Protection Agency's (EPA) justification for its development of the integral vista

concept in 1980 was drawn from several sources. The agency noted that many parks were set aside "because of their extensive vistas, expansive scenic views, unique natural formations or primitive value." The agency also boldly stated that "nowhere is there the suggestion that grand vistas integral to public enjoyment of a mandatory Class I federal area were not entitled to protection if the place viewed lay outside the area." (Freemuth, 1991)

The Park Service used two general criteria for the selection of its preliminary list of integral vistas in a 1981 Federal Register report. (1) the importance of the vista to the objectives for which the area was established, and (2) vistas that "significantly" contribute to visitor enjoyment of the area. The extensive valley network that comprise the Great Smokies along with its visual-friendly high elevation endorse the integral vista concept for this area.

The Summer of 1991 issue of Life confirmed that the most serious challenge facing the Park Service is pollution coming from park extremities:

Air pollution migrating eastward from Los Angeles basin can so foul the air above the Grand Canyon that it is impossible to see from one rim to the other. At times pollution places a gray pallor around the Blue Ridge Mountains of Virginia. And last summer park scientists deemed it wise to post Air Quality Index signs in Virginia's Shenandoah and California's Sequoia National Parks, where encroaching smokestack industries had boosted ozone levels and lowered visibility.

Polluted water flowing through the Florida Everglades, as well as water patterns changed by human intrusion, is thought to be responsible for a 90 percent reduction in wading birds since the 1930s. (Sulberg and Mason, 1991)

Though industry seems to be the major violater, Martini (1989) emphasized that traffic inside the GSMNP is a significant contributor and that pollution is becoming obvious to visitors:

The bluish haze that gave both the Smokies and the Blue Ridge Mountains their names used to come from oils and natural pollutants from plants mixed with high humidity. Now the natural compounds account for only 4% to 10% of the haze. The haze is now whitish in hue, and is composed primarily of acid sulfates produced by coal-burning power plants. These sulfates mix with moisture in the air to create sulfuric acid aerosols (acid rain when it falls).

Kemp (1992) explained the results of this precipitation:

The effects on plants may be direct, brought about by the presence of acid particles on the leaves, for example, or indirect, associated with changes in the soil or the biological processes controlling plant growth. Acid precipitation intercepted by trees may promote necrosis of leaf tissue, leaching of leaf nutrients, and chlorophyll degradation (Shriner and Johnston 1985), all of which cause visible damage. Vegetation growing at high altitudes, and therefore enveloped in cloud for long periods, frequently displays such symptoms, since moisture is often more acidic than rain (Hendrey, 1985).

Martini (1989) cited that high elevation spruce-fir forests in the Smokies are experiencing a decline in vigor and growth having already been decimated by an adelgid problem. Also, the red spruce in the last 10 years are exhibiting such stress

systems as thinned crowns, dead tops, and lesions on needle surfaces. Of all the white pines in the park, 90% are experiencing foliage damage attributed to ozone.

Not only are acid sulfates a problem, the presence of ozone concentrations and lead particulate matter from automobile exhausts is reaching extremely undesirable levels.

The resulting poor visibility obstructs 85 percent of summer days with some type of haze problem. Even on clear days, there is more air pollution in the Smokies than in western parks.

Visibility has traditionally been defined as "the greatest distance at which an observer can just see a black object viewed against the horizon sky" (Malm, 1984). Section 169A in the 1977 Clean Air Act Amendments states that "Visibility is...closely associated with conditions which allow appreciation of the inherent beauty of landscape features. It is important to be able to see and appreciate the form, contrast detail, and color of near and distant features" (Malm, 1984). This act gives the Park Service the "affirmative responsibility" to protect "air-quality related values," including visibility (Freemuth, 1991).

In the Great Smoky Mountains National Park, the automobile has become more than just a physical impairment to park resources, it is a psychological degradation as well. Current road access to the park, specifically the transmountain

highway, has split the wilderness preserve in half and allows the most artlessness of American tourists entry into a biosphere of incalculable value (Shepard, 1967).

Whether an area is crowded or not is the subjective judgment of an individual. In determining this coefficient, Larson and Hammitt (1987) stressed that a distinction should be made between density and crowding. Density refers to the number of individuals in a particular setting, while crowding is the negative evaluation of a certain density level which exceeds one's preferences in a situation. Hinds (1990) cited a 1988 poll wherein crowding is second behind natural beauty in various attributes associated with choosing an outdoor destination.

In response to public demands on parks in general, Carpenter (1982) referred to a 1980 published report by the National Park Service which compiled the responses of 310 individual NPS units in response to a questionnaire seeking information about the threats faced by each of the particular units. The term "threat" in this report was used to refer to:

Those pollutants, visitor activities, exotic plant and animal species, industrial and commercial development projects, etc., which have the potential to cause significant damage to park physical resources or to seriously degrade important park values or park visitor experiences.

Threat sources are those facilities, vehicles, physical structures, human or animal activities, etc., that cause real or potential impingements upon park resources. Sources can be associated with sudden, catastrophic events or slow-acting

processes. And they can be isolated by themselves or combined with a few to several sources.

It is interesting to note that these findings come from the Park Service itself and not from fringe extremists.

Carpenter (1982) stated that the NPS study examined, categorized, and in other ways summarized specific threats.

He pointed to the results that:

No parks of the System are immune to external and internal threats, and that these treats are causing *significant and demonstrable* damage. There is no question but that these threats will continue to degrade and destroy irreplaceable park resources until such time as mitigation measures are implemented. In many causes, this degradation or loss of resources is *irreversible*. It represents a sacrifice by a public that, for the most part, *is unaware that such a price is being paid*.
(emphasis added)

Further examination of the 1980 report showed a stunning reality: Seventy-five percent of the reported threats identified by the 310 respondents had not been adequately studied, and fifty percent of these threats were attributed to sources or activities located external to the park. In relation to the Great Smoky Mountains National Park, this "50 percent" figure of external threats may be considerably higher as it pertains to recent revenue statistics at the Pigeon Forge entertainment mecca located just six miles outside Park boundaries. The juxtaposition of this expanding economic base with the park has recently produced unique trends: *It is now common for vacationers to travel directly to Pigeon Forge and*

not even make it to the park (Trout, 1993). During a brief interview with a grade school teacher from Dalton, Georgia, an incident was revealed whereby one of her eighth grade pupils had told her of their visit to "the Smokies". When inquiring further about the visit, the student went into considerable detail about every water ride and video arcade that was "enjoyed". Nothing was mentioned of the national park!

Though the Pigeon Forge Bureau of Tourism states that the Park is still the number one draw (Trout, 1993), it is clear that an important portion of visitors have shifted their recreational compasses from natural esthetics to materialistic, short-term stimuli.

Industrial Tourism is a threat to the national parks. But the chief victims of the system are the motorized tourists. They are being robbed and robbing themselves. So long as they are unwilling to crawl out of their cars they will not discover the treasures of the national parks and will never escape the stress and turmoil of those urban-suburban complexes which they had hoped, presumably, to leave behind for a while (Abbey, 1969).

Joseph Wood Krutch said in 1957 that "machines come to be loved for their own sake rather than used for other ends." For example, instead "of valuing the automobile because it may take one to a national park, the park comes to be valued because it is a place the automobile may be used to reach" (Runte, 1987).

A generation later, Dave Foreman (1991) reiterated the

threat of industrial tourism:

Outdoor recreation has become big business. Large corporations, land developers, and small businessmen operating in National Parks (concessionaires) and "gateway" towns (including local chamber of commerce) have exploitative attitudes toward wildlands that rival those of loggers or miners. Unless the National Park Service can get back on track with a philosophy of ecosystem management, and kick out the concessionaires, the National Park ideal, which the United States gave the world, will become a cruel hoax.

Sax (1980) believed that if a national park cannot attract someone based on its own resources, then that visitor may not be ready for an encounter with nature. Leopold (1949) foresaw the coming of these distractions when he said: "Parks are made to bring the music to the many, but by the time many are attuned to hear it, there is little left but noise."

Though tourism was originally a prerequisite for providing the national parks with a solid economic justification for their existence (Runte, 1987), the results of this union in most cases has degraded the prime objective: "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

There are few constraints in national parks for able visitors who know what they are looking for. But for many, the agenda question is very much less settled. Though the initial experience for those visitors are stunning, it is not

long sustained. It is at this point that subtle administrative questions arise. There is every reason for a park to have hotel facilities for those who do not wish to camp in tents (the more aesthetically appealing the better). Supportive services-supply stores, unpretentious restaurants associated with hotels, and gas stations in more remote parks are perfectly appropriate. What do not belong in such places are facilities that are attractions in themselves, lures that have nothing to do with facilitating an experience of the natural resources around which the area has been established. (Sax, 1980) As early as 1934, Robert Marshall, scouting the Smokies for the Department of the Interior, wrote:

I hiked to Clingman's Dome last Sunday, looking forward to the great joy of undisturbed nature for which this mountain has been famous. Walking along the skyline trail, I heard instead the roar of machines on the newly constructed road just below me and saw the huge scars which this new highway is making on the mountain.

Returning to where a gigantic, artificial parking place had exterminated the wild mountain meadows in Newfound Gap, I saw papers and the remains of lunches littered all over. There were over twenty automobiles parked there, from at least a quarter of which radios were blaring forth the latest jazz as a substitute for the symphony of the primitive (Frome, 1992).

What this sixty year old observation presents is half of the problem: the psychological carrying capacity of a given area. The other half consists of the physical or biological carrying capacities. When has an area reached its carrying capacity? Where does the Great Smoky Mountains National Park

rank in this saturation scale? What can be done to get an area back within its natural rate of equilibrium?

METHODOLOGY PRESENTATION

Data Sources

The following forms of analyses and reference sources have been used to determine visitation trends and visitor types; legislative and environmental statutes; economic and climatic statistics; biological conditions; and philosophical alternatives.

1. Park Visitation Statistics: All categories of visits for the years 1988-1993 were accumulated from Park Headquarters.
2. NOAA: Regional data were obtained to investigate correlations between climate and visitation trends.
3. Personal Surveys: Taken from the two major access points into the park, random visitors were briefly asked the purpose of their trip and accessibility preferences.
4. Phone Surveys: From the Atlanta Metropolitan area, these respondents who had previously visited the park were asked about the intent of the trip and a measurement of crowding was included in the line of questioning.
5. Interviews: In person conversations with park rangers, park librarian, park historian and a biologist were helpful in supplying both facts and opinions.
6. Economic Statistics: Impact of surrounding amusement industries supplied by the East Tennessee Development District, Knoxville.
7. Independent Libraries: Broad array of information relevant to subject, including environmental law and the development of the National Park system.

The Limits of Acceptable Change Concept (LAC)

The current struggle with automobile absorption within the Great Smoky Mountains National Park and the surrounding entertainment magnets will be evaluated with the aid of a planning system offered by Stankey, McCool and Stokes (1990).

This model will help outline the ideas produced throughout this study and provide the framework for developing decisions as to preservation being a primary versus secondary consideration. The Limits of Acceptable Change Concept is a managerial tool with an applied range from primitive wilderness settings to densely used recreation areas. The following LAC guidelines were used in this research:

1. Identify Area Issues and Concerns

-issues and managerial concerns that relate to (a) distinctive features and characteristics of the wilderness area and (b) the relationship of the individual area to other units of the wilderness system and to nonwilderness areas.

2. Select Indicators of Resource and Social Conditions

-criteria to guide selection of indicators would include (a) the indicator should be suited to being measured in a cost-effective fashion at acceptable levels of accuracy (b) the condition of the indicator should reflect some relationship to the amount and/or type of use occurring. (c) social indicators should be related to user concerns (d) the condition of the indicator should be at least potentially responsive to management control.

3. Inventory Existing Resource and Social Conditions

-capacity surveys, visitation trends, biological effects, economic impacts.

4. Specify Standards For Resource and Social Indicators

-by using data collected in Step 3, it is possible to specify standards that describe the acceptable and appropriate conditions.

5. Evaluate and Select a Preferred Alternative

-Some questions to guide this selection include

(a) Which user group are affected and how (does it facilitate or restrict use by certain groups)?

(b) Which values are promoted and which are diminished? (c) Does the alternative contribute a unique kind of wilderness setting to the system?

Visit Counts

In analyzing visit counts for the Great Smoky Mountains National Park (obtained from park headquarters), this study concentrated on a six year interval from 1988 to 1993 including concurrent personal surveys in 1993 and subsequent findings thereafter. Earlier data were examined for cyclical correlations that might affect the six-year term. Cordell and Hendlee (1982) describe visitation counting procedures used for these statistics based on traffic counters placed around the park. Each entry into the park is defined as a visit. Factors for average group size per vehicle of 3.1 during weekdays and 3.5 for weekend days were used to project an estimate of visits from the traffic counts. In order to convert the estimated number of visits to an estimated number

of individuals, the following formula was used:

$$NI = \frac{(V/Y) \times L}{(V/D)_1 \times (D/T)_1 \times (T/Y)_1} + \frac{(V/Y) \times NL}{(V/D)_{nl} \times (D/T)_{nl} \times (T/Y)_{nl}}$$

Where NI = Total number of individuals using park per yr
 V/Y = Number of visits to park per year
 L = Percentage of visitors that are locals
 (V/D)₁ = Average number of visits per day by locals
 (D/T)₁ = Average number of days per trip by locals
 (T/Y)₁ = Average number of trips per year by locals
 NL = Percentage of visitors that are nonlocals
 (V/D)_{nl} = Average number of visits per day by nonlocals
 (D/T)_{nl} = Average number of days per trip by nonlocals
 (T/Y)_{nl} = Average number of trips per year by nonlocals

$$\begin{aligned} NI &= \frac{9,319,300 \times .125}{1.08 \times 1.32 \times 27.11} + \frac{9,319,300 \times .875}{1.13 \times 3.00 \times 1.44} \\ &= 30,140 \text{ local visitors} + 1,670,981 \text{ nonlocal visitors} \\ &= 1,701,121 \text{ visitors} \end{aligned}$$

(note: there is a distinction between number of visitors and number of visits)

Field Survey

In addition to gathering existing data on visitation, a series of personal surveys were performed to detect visitor intentions and accessibility preferences. A sample survey is shown on the following page. The surveys were conducted at the two popular access points located just outside park boundaries in the tourist-laden communities of Pigeon Forge and Gatlinburg, Tennessee and at the southern entrance in Cherokee, North Carolina. (See Figure 1, page 8) In an effort to acquire as many random samples as possible, subjects were

Table 1: 1993 Sample Survey Form in Determining Visit Intent and Access Preference

Date _____

Site _____

Location _____

Time _____

Question 1: Which recreational area was the main purpose for your visit?
check one

- _____ a) Great Smoky Mountains National Park
_____ b) Pigeon Forge/Gatlinburg or Cherokee
_____ c) Both

Question 2: Would you still have come if the road crossing the park was not available for use?

- _____ a) Yes
_____ b) No
_____ c) Maybe

If you answered Yes or Maybe to Question 2, Answer Question 3

Question 3: If the road was not available, would you use a nonmotorized means to enter the park?

- _____ a) Yes
_____ b) No
_____ c) Maybe

picked without any bias to appearance that might have construed a certain type of desired activity. All attempts were made to complete the surveys in service-related facilities and not amusement parks, etc., to help reduce any skewed result. During the weekends of July 30,31; August 13-15; and August 27-29 in 1993, a total of 378 participants were surveyed at all locations to determine the recreational magnet that was initiated and an access function.

Phone Survey

This thesis also used an additional survey to tabulate additional responses to the current carrying capacity difficulties that face the GSMNP. A random sampling by telephone in the Atlanta, Georgia Metropolitan area was completed with 64 people surveyed who had previously visited the GSMNP. In a humorously simple procedure of opening the phone book and blindly putting the finger on a name, it took 280 calls to get the 64 respondents identifying an approximate 1 in 4.5 ratio of those who had been to the area in question.

The callers responded to inquiries as to their purpose of the visit whether for backpacking, car camping, a day drive, or combined with lodging in surrounding communities. Also asked was: "Would you still have completed your trip to the Great Smokies if Highway 441 was not available for use?"

VISITATION TRENDS IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK*Annual Total and Summer Visitations*

Total annual visitation trends between 1975 and 1992 have been relatively inconsistent. The late seventies showed strong numbers that dropped considerably in the early eighties due to recessionary influences. The late eighties saw a sharp increase to record levels thanks to 50-year park anniversaries, fair weather and less foreign travel in relation to international terrorism. Since 1987 visitation totals have plummeted then moderately recovered.

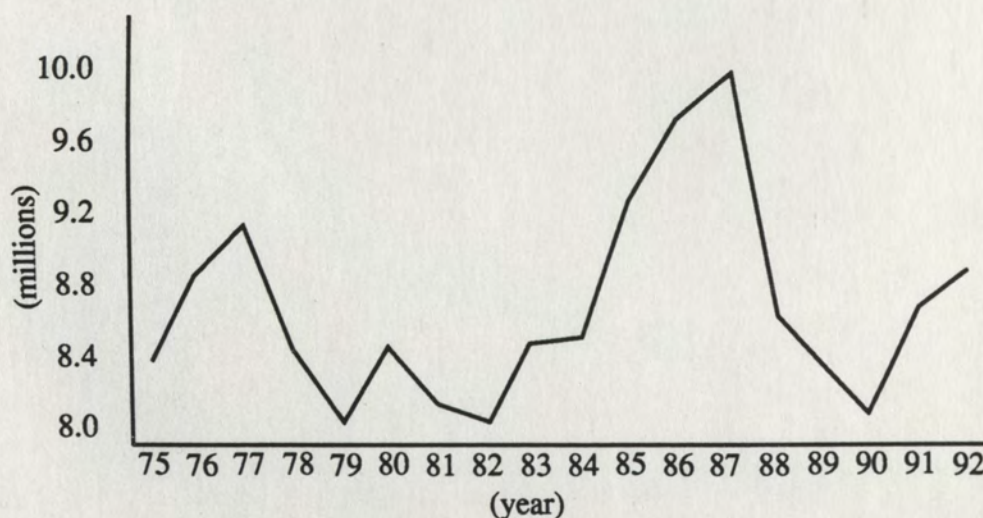


Figure 2: Total Annual Visits for GSMNP 1975-1992

The park's modest increase in visits since 1990 has brought annual totals back to mean levels. But a more important trend shows different implications.

A 1974 GSMNP visitor sampling survey shows that 78 percent of visitors prefer summer as their favorite season for vacationing. Though no data are available to show what percentage actually did visit during the 1974 summer months, recent data obtained at Park Headquarters reveal that 1988 summer visits (June, July, August) were 50 percent of total annual visits for that year. Remarkably, in the following four years, from 1989 to 1992, this percentage has decreased consistently to a low of 41 percent in 1992. Even recent data collected reveals 1993 percentages unchanged from 1992.

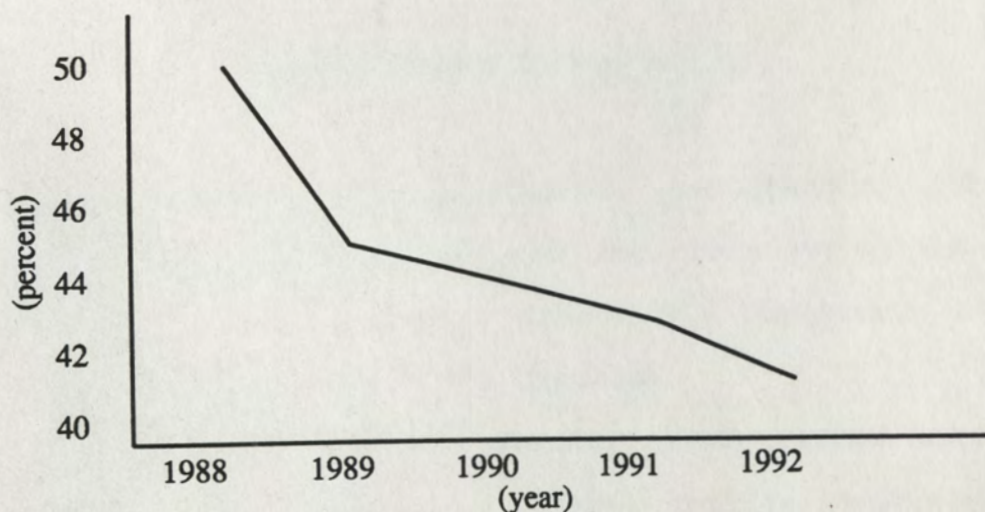


Figure 3: Percentage of Summer Visits to Total Annual Visits

This relationship raises these questions:

1. Is the summer decline simply a function of more visitation throughout the rest of the year?
2. Is the decline related to climatic anomalies in the Southeast U.S.?
3. Is the decline significant as a percentage of total annual visits?
4. Where are the summer visitors going and why?

The summer decline does not appear to be associated with increases in other seasons of the year, though there have been slight increased visits in winter months over the past three years. The percentage decrease in summer visitation since 1987 of 9 percent (from 50% to 41%) is congruent with the fall in total summer visitation from 4.4 million in 1987 to 3.6 million in 1992.

Summer Climate in the Region

To examine climatic influences, precipitation data were obtained through NOAA (1988-1992) for three key cities in the proximity of the region: Knoxville, Tennessee; Atlanta, Georgia; and Asheville, North Carolina.

After averaging summer monthly precipitation totals for all three cities, (Figure 4) the results demonstrate no unusual pattern of either extreme dryness or wetness which could have affected summer visitation trends since 1987.

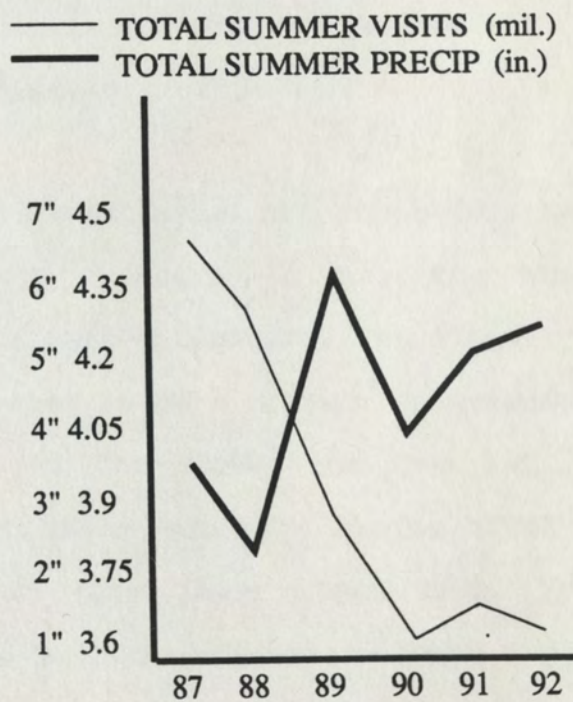
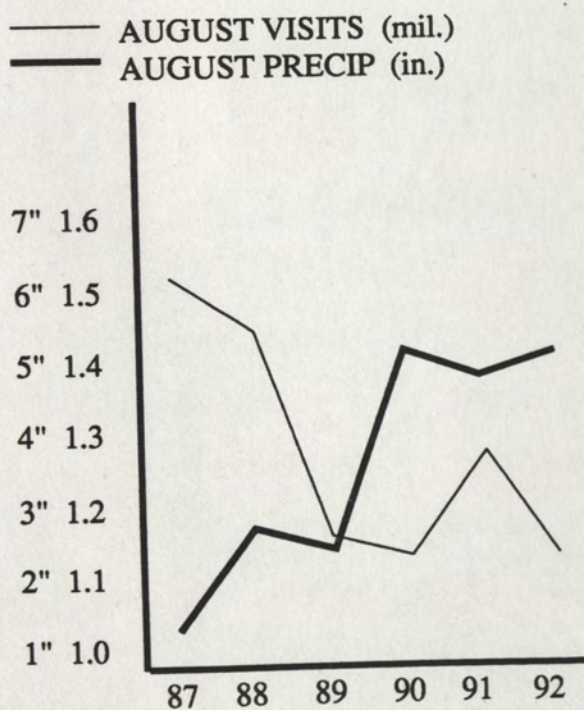
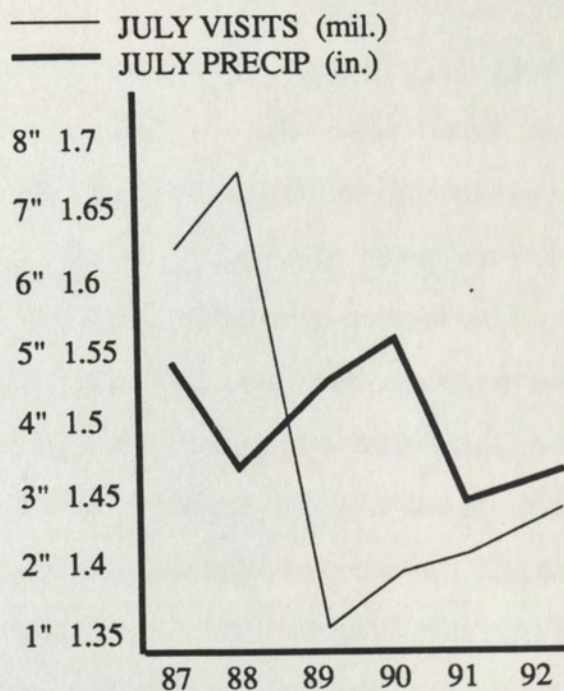
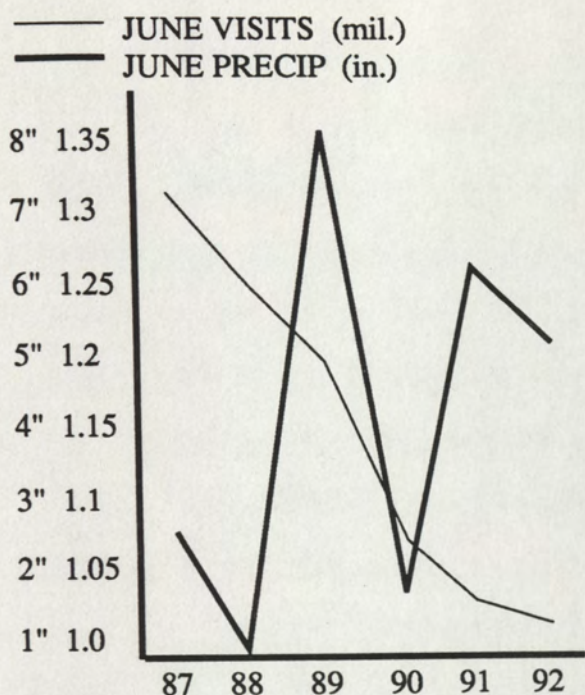


Figure 4: Relation Between Summer Precipitation and Visits

The data in Figure 4 show a very dry summer in 1988, followed by a very wet summer in 1989. The next year was fairly normal while 1991 and 1992 showed moderate increases. Meanwhile, the summer visitation drop is steady throughout. Based on the wide fluctuations in precipitation compared to a consistent visitation decline, it appears regional climate has not been the catalyst for visitation trends in the past six years. In addition, a substantial number of visitors come from states outside the immediate geographic region. Also, because of its topographic features, the Smoky Mountains create its own moisture-producing capabilities with some parts of the park getting as much as 100 inches of rainfall a year.

Industrial Tourism

The summer disappearance of almost a million annual visits could be considered a cyclical pattern if not for the exploding economic growth on the park's boundary, specifically that of Pigeon Forge. There appears to be a connection between the loss of summer visitors in the GSMNP and the self-perpetuation of "industrial tourism". Peine and Renfro (1988) report that revenues in Pigeon Forge have risen from 120 million dollars in 1985 to 210 million dollars in 1987. My sources (Powell, 1994) have carried those statistics further (Figure 5) to cover the same visitation span through 1993:

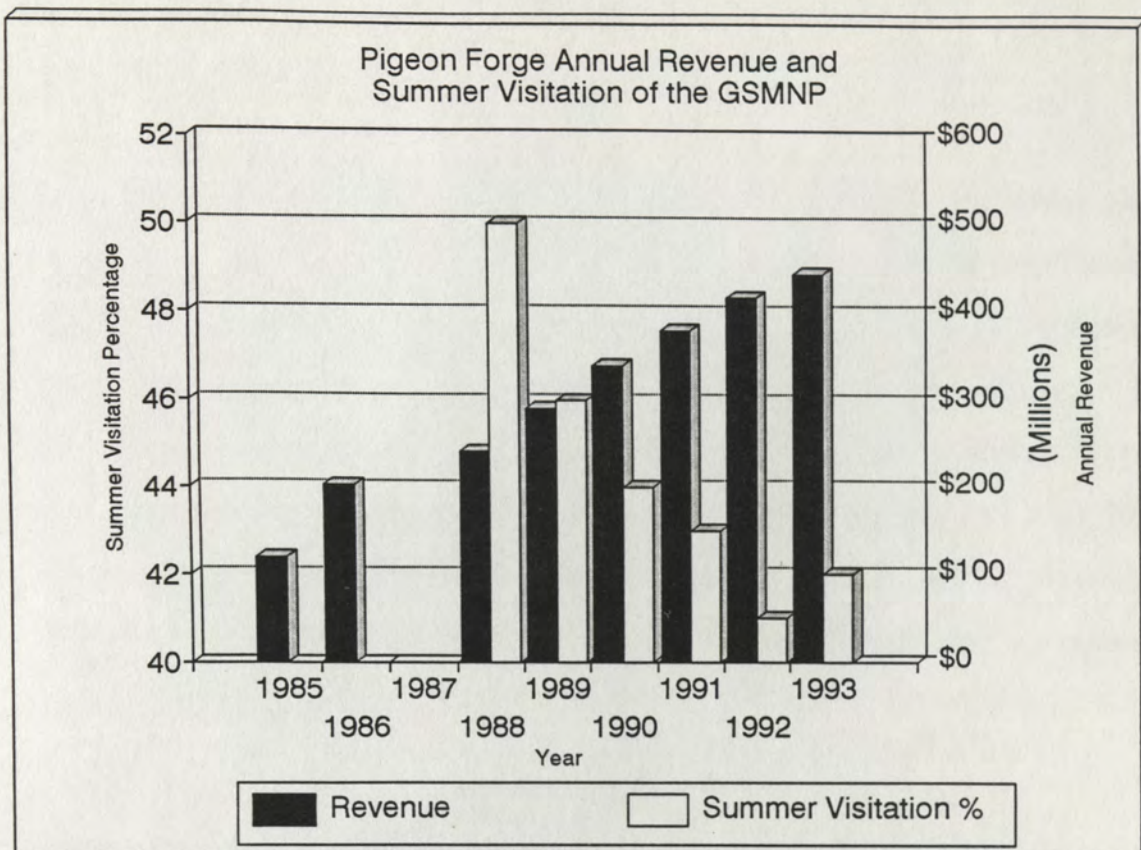


Figure 5: Comparison of Pigeon Forge Annual Revenue and Percentage of GSMNP Summer to Annual Visits
(Source: East Tennessee Development District, Knoxville)

Figure 5 indicates that there maybe a significant shift in visitor preference in prioritizing their nature experience or recreational objectives. More evidence of rapid "industrial tourism" trends can be found in records of Annual Sales Receipts From Lodging for Sevier County, Tennessee. From 1987 to 1992, the same time interval as the summer trend percentages for GSMNP, annual receipts rose from \$113,406,000 to \$173,547,000, an increase of over 60 million dollars. (Sevier Co. E. Tennessee Development Dist., Knoxville, 1994)

Initially, both the Great Smoky Mountains National Park and the surrounding economic entertainment outgrowths

benefited from each other in drawing visitors. At some point the line was crossed as burgeoning growth "that has nothing to do with facilitating an experience of the natural resources around which the area has been established" (Sax, 1980) overtook the esthetic value and purpose of the national park.

The conflict between development and nature and the human desires for both is an unending battle. Nash (1982) explained this graphically (Figure 6) through the economists concept of marginal valuation.

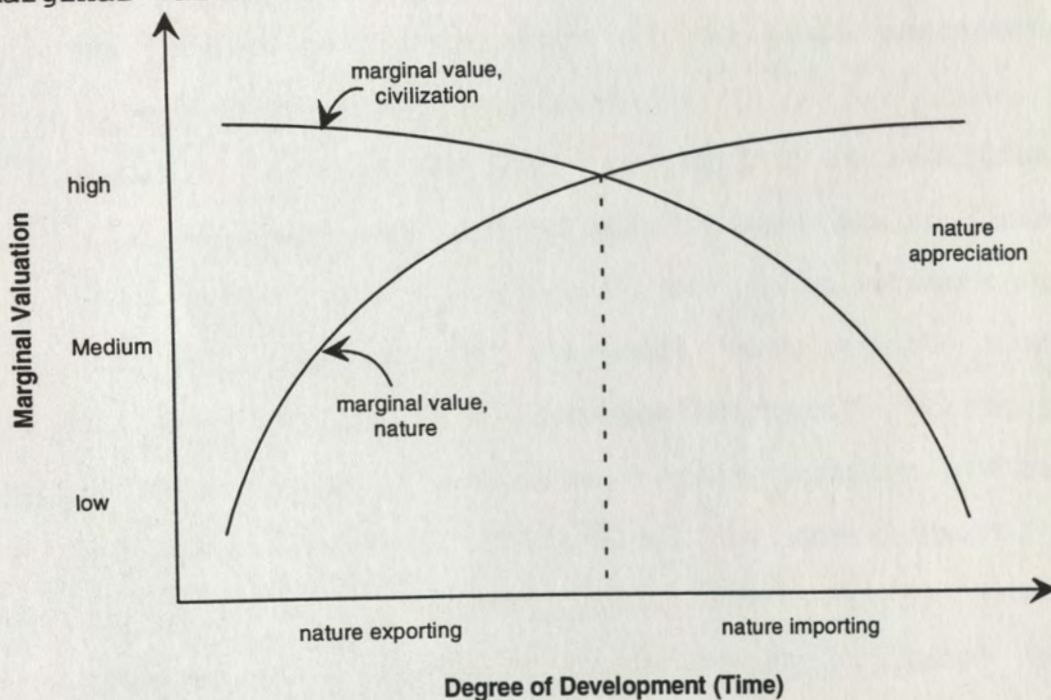


Figure 6: Changing Attitudes Toward Nature and Civilization With Development

The vertical axis in Figure 6 measures the value a society attaches to an extra unit of the commodity or experience in

question. The horizontal axis measures the degree of economic development in the society and is roughly equivalent to historical time. Read from left to right, the graph shows what happens to the relative valuation of wild nature and civilization as a nation undergoes development. Initially the valuation of civilization is much higher than that of wildness favoring nature exporting. Eventually, civilization becomes plentiful and nature scarce changing the valuation of each encouraging nature importing. The widening vertical distance between the curves to the right of the graph represents the growing amount of nature appreciation.

Krutilla (1967) added that "the utility to individuals of direct association with natural environments may be increasing while the supply is not readily subject to enlargement by man.

Natural environments will represent irreplaceable assets of appreciating value with the passage of time." Catton (1980) offered an outline of responses to this paradigm (Table 2).

In evaluating visitor expectations in their quest for a relationship or experience with the natural world, a presumption of expectation needs to be included in the equation. The following concept could be drawn upon to categorize where we stand in viewing resource use for public recreation and the appropriate stewardship of those resources. The visitor's ecological state of mind, if properly studied, could help place our position on the marginal valuation curve.

Table 2: Analysis of Several Modes of Adaptation to Ecologically Inexorable Change

Adaptations	Circumstance:	Consequence:	Names
	The Age of Exuberance is over, population has already overshoot carrying capacity, and prodigal Homo sapiens has drawn down the world's savings deposits.	All forms of human organization and behavior that are based on the assumption of limitlessness must change to forms that accord with finite limits.	
I. Some people recognize that the New World is old and that major change must follow.	= circumstance accepted	+ consequence accepted	= Realism
II. Some people have faith that technological progress will stave off major institutional change.	= circumstance accepted	+ consequence disregarded	= Cargoism
III. Some people have faith that family planning, recycling centers, and anti-pollution laws will keep the New World new.	= circumstance disregarded	+ consequence partially accepted	= Cosmeticism
IV. Some people do not believe that the New World's newness once did, or that its oldness now does, have any significance.	= circumstance disregarded	+ consequence disregarded	= Cynicism
V. Some people insist that the assumption of limitlessness was and still is valid.	= circumstance denied	+ consequence denied	= Ostrichism

Another aspect in sociologic change and growth overshoot was provided by Hendee, Stankey and Lucas (1990), "Although the past 25 years have shown a generally steady increase in the level of recreational use of wilderness, more recently this trend has begun to alter, characterized by a growing stability, and in some cases, an outright decline in use. The reasons for this are not altogether clear...but it is at least partially linked to the pervasive changes in the structure and composition of society-particularly in the age, distribution, and socio-economic status of its people. As in all systems, *growth could not simply go on forever.*" (emphasis added)

Visitor's Intent Revealed by Survey

Implications point toward the social structure of America becoming so fast-paced that more is wanted for less effort; that core, hard-to-get-to, regions of wilderness areas are being avoided temporarily until easier means of entry are offered.

For the Great Smoky Mountains National Park, the staggering revenues from surrounding tourist areas should have been evident enough in the proliferating economic activity that has leached most of its success from the unfocused "back-to-nature" mentality of the rushed visitor, and has even created its own type of tourist (i.e. the eighth grade student).

During the 1993 weekend surveys, the initial object of questioning was to determine recreational intent. Inventoried with standard hashmark procedures, Table 3 shows the final results to the first question of visitor intent.

Table 3: Accumulated Responses of 378 Participants to Question 1 in the 1993 Summer Survey in GSMNP

Question 1. Which recreational area was the main purpose for your visit?

Location A: Pigeon Forge, Tennessee

- (a) Great Smoky Mountains National Park (46%)
- (b) Pigeon Forge/Gatlinburg (20%)
- (c) Both (34%)

Location B: Cherokee, North Carolina

- (a) Great Smoky Mountains National Park (55%)
- (b) Cherokee Indian Reservation (16%)
- (c) Both (29%)

C: Combined responses

- (a) Great Smoky Mountains National Park (51%)
 - (b) Amusement centers (18%)
 - (c) Both (31%)
-

The results of the survey point to important tendencies that substantiate the prior theories of an abbreviated, rushed and mis-prioritized public in its pursuit of leisure. There appears to be a splitting of regional magnets. In consolidating the findings, nearly half of those surveyed said their recreational intent was influenced either completely or

partially by the existence of amusement facilities located in adjoining proximity to the Great Smoky Mountains National Park. This shows a strong tendency to equate a major portion of these tourists with only temporal reactions to the resources that are contained with the GSMNP.

The numbers game, though, is the political problem facing the national parks. Originally the parks had to rely on its popularity to even be considered for institutional status. Now that the parks are well established, the visitation statistics are valuable for increasing or sustaining budget allocations. When visitor excess lead to threats of resource degradation, the Park Service has traditionally taken a position of moderation for several reasons. Freemuth (1991) explained that the Park Service is not an expert agency with a professional accountability system but, rather, a more responsive one with a political accountability bureaucratic system concerned with questions of representation, access, and responsiveness to public demands.

One solution is suggested by Gray (1988) in trying to execute more power to the Park Service, through statutes as the National Wild and Scenic Rivers Act along with others, including the National Park Service Organic Act, the National Parks and Recreation Act of 1978 and the Wilderness Act of 1964. He urges Congress to take a more active role to supplement regulatory and enforcement authority in

conservation statutes in that they should grant the Park Service more direct authority to regulate, and even prohibit, private activities that threaten to harm the values protected by wild and scenic designation. Also, Congress should execute Park Service action in fulfilling purposes of these statutes augmenting the enforcement powers of the Park Service and the Department of Justice by including an express private right of action in the statute.

CARRYING CAPACITY

Carrying capacity can be defined as the amount of use an area can receive without losing its capability to provide a level of output that sustains its own resources at a degree of natural replenishment. In one of the first uses of the term, Lowell Sumner in 1942, urged that use of wilderness be kept "within the carrying capacity or recreational saturation point." He described carrying capacity as "the maximum degree of the highest type of recreational use which a wilderness can receive, consistent with its long-term preservation" (Hendee, 1990).

Catton (1980) tried to tackle the problem of quantifying carrying capacity as "the number of us, living in a given manner, which a given environment can support indefinitely. An environment's carrying capacity for a given kind of creature (living a given way of life) is the maximum persistently feasible load-just short of the load that would damage that environment's ability to support life of that kind." Glantz (1977) went further to explain that "when the load at a particular time happens to be appreciably less than the carrying capacity, there is room for expansion of numbers, for enhancement of living standards, or both. If the load increases until it exceeds carrying capacity, overuse of the environment reduces its carrying capacity." Catton (1980)

urged that this "is why it has become important to recognize the difference between increasing the number an environment can support indefinitely and surpassing that number by accepting environmental damage. Overuse of an environment sets up forces that will necessarily, in time, reduce the load to match the shrinkage of carrying capacity."

Difficulties in Determining Carrying Capacity

Patterson and Hammitt (1990) revealed the frustration that can occur in evaluating this elusive coefficient. They found that 63 percent of their study's respondents (of backcountry setting) whose encounter norms were violated did not express a negative reaction when actual encounters exceeded personal norms. Four explanations were offered for this finding: (a) many backcountry users do not have a clear or salient conception of what a tolerable number of encounters is, (b) visual-social encounters are only of minor importance in the overall solitude experience found in remote environments, (c) limitations in our measurements resulted in the apparent noncongruent relationships between norms and reactions, and (d) the number of encounters is important to respondents, but conformity of behavior to normative beliefs is not a certainty.

Another factor is the expectation of an experience in the

natural world. A remote hiker's idea of what defines wilderness will be far different from the vehicular tourist who has previously visited the bottleneck traffic areas of a given park. The capacity saturation level will be much higher for the motorist (as evidenced in the telephone survey of "car-lodgers", Table 4, p. 46).

To escape the relativity of this problem it would seem necessary to look at the 'big picture'. Maybe one does not need a numerical boundary line to determine whether an area has reached its carrying capacity. Combining behavioral discord with visible evidence of resource alteration suggests new managerial approaches.

In considering an area's carrying capacity, Hendee (1990) emphasized four major points:

1. Carrying capacity is a relative term, not an absolute number to be discovered by managers or researchers. *Its range depends on specific objectives established for an area.*
2. Capacity must be established and identified in the field by managerial judgments-no magic yardstick can tell when it will be or when it has been exceeded.
3. Capacity is tied to (a) the qualities of the physical-biological environment and (b) the qualities of the human experience available in wilderness.
4. The development of capacity limits is a necessary part of the planning process for those areas and locations where unacceptable change may occur. To achieve the long-term goals of wilderness preservation, time and space aspects of wilderness use must be managed to avoid unnatural changes.

This leads us to the compelling question: What are the specific objectives of the National Parks? Without those objectives thoroughly spelled out, beyond the rhetoric of political public relations, the carrying capacity range cannot be delineated. A park's objectives should reflect the importance of its resources. Those resources should maintain their *naturalness*-freedom from significant influences of modern technological humans. Human activities can affect several key attributes of ecosystems that would define an exceedance of carrying capacity (Franklin, 1990). First, they can affect the *functional ability* of the ecosystem, the capacity to perform key actions-to fix and cycle energy, conserve and cycle nutrients, and provide suitable habitat for an array of inhabiting species. Second, they can affect the *structure*, or spatial arrangement of the parts, of the ecosystem. Third, they can affect the *composition* and *population structure*, that is, the number of species and their relative abundance as well as their densities, age- and size-class distributions of individual species. Finally, human actions can alter basic *successional patterns* characteristic of a given site.

Carrying Capacity of the Great Smoky Mountains National Park

In an attempt to measure a sense of crowding among visitors in the Great Smoky Mountains National Park, the telephone survey method (Table 4) assessed values of 1 to 5 in response to this issue.

Table 4: Primary Use and Measurement of Crowding Among 60 Telephone Respondents in Previous GSMNP Visits

<u>type of use</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>
Backpack.....	1	2	1	0	0
Car Camp.....	4	9	4	0	0
Car Lodging.....	2	6	9	6	2
Car Day Drive.....	5	6	1	2	0

5 = much too excessive, 1 = not excessive at all

note: only 60 total interview results are shown in table 4
because four respondents had visited in winter months

Generally, the sense of crowding seemed to be skewed toward "much too excessive" though the samples were not large enough to say that the backcountry is over carrying capacity in this respect. But there is good news for the economic amusement centers around the GSMNP, as most "car lodging" respondents did not consider the crowds to be that abusive toward their experience. There is a problem here in that though the traffic problem is visually obvious, most visitors are not affected too severely by it. It is difficult to place

a numerical value on psychological carrying capacities because of the myriad of personal interpretations of what constitutes solitude or crowding.

The most dangerous threat facing the Great Smoky Mountains National Park is ironically from the very visitors that it must sustain in order to maintain Federal funding or survive budget cuts, though even that may not be enough: In the spring of 1995 a bill was introduced to actually *close* some national monuments, a proposal which could lead to the possibilities of closing national parks. This political reality urges that the concept of carrying capacity be spread to all levels of management before more irreversible affects can occur. The demands of an excessive number of tourists need to be weighed against not only what the Park Service can supply, but against what the actual resources that it supposedly protects can supply.

APPLICATION OF THE LIMITS OF ACCEPTABLE CHANGE CONCEPT (LAC)

Identify Area Issues and Concerns

The psychological limitations differ between a commercial recreational experience and a true wilderness experience. It has been a concurrent theme throughout this study that the Great Smoky Mountains National Park holds unique value for the latter but the high majority of its users opt for the former.

This behavioral pattern and accelerated shift (not to imply that tourism has not always leaned toward the mundane - just that it is more pronounced), has been highly influenced by the economic distractions at the two major access points to the park.

The relationship and important contributions that this World Heritage Site can contribute to surrounding ecosystems will never be realized if drastic measures can not be applied to the current problems of overcrowding and ease of accessibility to motorized traffic, specifically through the heart of the biosphere via the transmountain highway, US 441 (Figure 1).

In addressing the issue of visitor access to this highway, questions were asked in both the personal survey and the phone

survey (Table 5).

Table 5: Combined Responses to Road Access Questions of 1993 Summer Survey and Phone Survey in GSMNP

Question 2: Would you still have come if the road crossing the park was not available for use?

(a) Yes 67% (b) No 19% (c) Maybe 14%

Question 3: If the road was not available, would you use a nonmotorized means to enter the park?
(respondents who answered Yes or Maybe to Question 2)

(a) Yes 11% (b) No 77% (c) Maybe 12%

Phone Survey: Would you still have completed your trip if the transmountain highway was not available ?

<u>Type of use</u>	<u>Yes</u>	<u>No</u>	<u>Maybe</u>
Backpack.....	5	0	0
Car Camp.....	10	5	2
Car Lodging.....	21	2	2
Car Day Drive.....	4	2	7

The eighty-one percent that answered positive in response to not altering their visit even if access to the park was not available via the transmountain highway (Question 2) emphasizes leisure interests for simply a "taste" of wilderness and that possibly for these visitors peripheral vistas, campgrounds and roadways would be sufficient in satisfying their objectives. Also of interest was the overwhelming response from the "Car Lodging" respondents, where 21 of 25 said they also would have still continued their trip, indicating that they are as much concerned with stimuli external to the park though the park may have contributed to

the overall decision in choosing the destination. This same group scored as least concerned with overcrowding (Table 4), and they provided good news for the surrounding communities that little negative economic impact would be felt. Also, the "Car Camp" group would not be greatly lost, 12 of 17 relaying a positive reaction to returning without the use of the highway (all campsites are at perimeter borders of the park anyway). Yet this group thought these areas were already excessively crowded, but their carrying capacities being higher, they were willing to accept the crowds with the effect still being noticeable. If these figures are accurate in a broad sense, it could quell fears of considerable negative public backlash from a road closure proposal. If the highway were closed, the resultant bulge of traffic at both park entry points would eventually filter into adjacent campsites and towns after spreading news of the alteration.

Finally, and probably to the dismay of some Park Service officials that want to promote more off-road involvement within the park boundaries, only 11% said they would use non-motorized methods to gain access if the transmountain highway was not available. But perhaps to gain 11% more genuine environmentally-conscience tourists to discover the park's resources up close and in depth is a greater reward than shuffling through a mass of humanity that depletes those same resources to an eventual compromise, at best, or extinction,

at worst, for nobody to benefit from in the end.

"Parks are not hermetically sealed enclaves impervious to influences from lands and resources around them, nor are they shielded from influencing those same resources" (Simon, 1988). Aspiring to promote this reality to the furthest degree is Wild Earth's "The Wildlands Project" (Wild Earth, 1992). Their mission is "to help protect and restore the ecological richness and native biodiversity of North America through the establishment of a connected system of reserves."

Their proposal is a noncompromising vision to "free" the islands of wilderness that comprise our national parks by joining them with other ecosystems allowing migratory movement and natural ranges of ecologic diversity. The use of core reserves (national parks, refuges, designated wildernesses) would be linked by biological corridors and additional buffers to protect the integrity of the system. Obviously road closures or restrictions would be part of the proposal. The idea of creating buffer zones around national parks, specifically, is not a new one. In 1975, during congressional action to expand the boundaries of Grand Canyon National Park, Barry Goldwater of Arizona introduced legislation that included a buffer zone, or "zone of influence," around the park. (Freemuth, 1991) In totality, Wild Earth's proposed corridor would run from North Georgia's Chattahoochee National Forest to Virginia's Shenandoah National Park. They are light

years ahead of this study in terms of depicting problems of carrying capacities versus protection of remaining wilderness. Based on the severity of the problem, they have gone beyond "protection" and focused almost exclusively on "restoration".

Select Indicators of Resource and Social Conditions

Indications of conditions inside and outside the Great Smoky Mountains National Park from both a biological and social viewpoint have been clearly stressed within the preceding pages of this report. The entrances to the park exhibit carnival-type developments and the suburban sprawl of second homes threatens the integrity of park resources. The physical or biological concerns have only one solution: reduction, restriction or elimination of the adverse encroachment.

The social concerns involve the Park Service becoming more interactive with local communities and legislatively activating their existing authorities. Often many superintendents are not trained in planning and other aspects of public administration. (Freemuth, 1991) This will need to change so they will have a more involved community awareness as adjacent growth becomes a problem for increasing number of parks.

Simon (1988) called for more citizen involvement in addition to the Park Service's need of using its legislative avenues, "Participation requires alertness and preparation to make informed comments. Past efforts by hard-working citizens opened up the planning and NEPA (National Environmental Policy Act) processes so we can fully participate in shaping the future of the parks. This opportunity calls for effective participation by competent citizens." This has been a catch-22 situation for environmentalists: the need to ally with the public for legislative change for park resource protection, realizing most of these same people are who they want to protect the park from. Here, the need for proper education becomes apparent.

First, both citizens and the National Park Service already have substantial existing authority to act on behalf of the parks in protecting them from diverse types of threats (Simon 1988). There is no reason to back away from insisting that the parks remain unimpaired--that they receive the very highest level of protection possible. Second, existing authority permits and requires the Park Service to be a very active player in the land management decisions of private citizens, local governments, and other federal authorities. This authority is overlooked, underutilized and untested. Thirdly, litigation should be used as a last resort; it essentially reflects the failure of the planning process.

Litigation can cajole, command, compel and force analysis. It sometimes resolves an issue when negotiation fails, but frequently does not; the courts are simply not suited to make complex land use choices. Ultimately, decisions on protecting our parks must be made in other arenas: boardrooms, offices, legislatures and schoolrooms. Attitudes and values, not merely judicial decisions, must be influenced (Simon 1988).

Finally, in relation to the current psychological conditions affecting the Great Smoky Mountains National Park and surroundings, Hammitt and Patterson (1991) contributed a model of behavioral coping that could be applied to all forms of contact among recreationists though their study was based on backcountry encounters dealing with minimal contact. Their model specifies three types of "coping" in avoiding visitor encounters that may detract from a wilderness experience, if that is the goal. The first type is "displacement" in which the person literally leaves the situation. Displacement occurs when individuals who are dissatisfied with encounters move to less crowded areas. Those with norms more tolerant to encounters will displace them. A second form of coping is "product shift". This involves a re-evaluating of the encounter rather than the overt avoidance behavior of displacement...An example of this redefining of experience would be when a remote hiker expecting few encounters, instead meets large numbers of people. The hiker might take note of

circumstances surrounding this event by observing the wide and heavily trampled trail and worn out campsites and conclude that maybe this is not a place for a wilderness experience. If the new experience is defined as hiking on a developed trail, a different criteria may be used to evaluate and thus cope with the number of visitor encounters. The third reaction to visitor encounters comes in the form of "rationalization". This is a process based on dissonance theory suggesting that recreational activity is voluntarily selected and most participants will rationalize the environmental conditions as satisfactory, including encounter and privacy levels. A substantial investment of money and vacation time to participate might also lead to a post-evaluation of the influence of encounters on wildland privacy and the anticipated recreation experience.

The resource indicators, in contrast to the social conditions, of the GSMNP have a greater chance of being influenced by management as they are confined under their umbrella. Using the park's status as a World Heritage Site and International Biosphere Reserve combined with bold initiative by park officials, the alleviation of social threats can remove the current challenge to the preserve's integrity.

Inventory Existing Resource and Social Conditions

In addition to the extensive physical resources that the park possesses-the biological species, native mammals and geomorphic uniqueness (page 4), and inclusive with surrounding socio-economic impingements and other scientific criteria, common sense needs to be added to the evaluation process of possible preferred alternatives for park recreational use. Also a comparative analysis in relation to other trends in American society would provide insight to exactly what is going on in the 'big picture'. One simply has to look at the outskirts of any metropolitan area, the outskirts of even smaller municipalities-sometimes your own neighborhood will suffice.

The data "points to", "implies", "shows tendencies", but nevertheless upholds the trends that now can be seen with the naked eye. Some evidence is undisputed: The revenue increases within the Pigeon Forge, Tennessee district, the biological decimation of certain trees, the haze, the caravan of cars. Other evidence, as the limitations of social carrying capacities, are still variables that need better modeling and more intensive research to apply. Many examples of past studies exist to substantiate this problem. McDonald and Hammitt (1979) attempted to evaluate user satisfaction within three recreational stream sources near the Great Smoky

Mountains National Park. They also found that regardless of use density, users still reported high levels of satisfaction.

They concluded that "a satisfaction-based carrying capacity cannot be identified within variation of current use levels...Heavy reliance on use limits as a means of managing user satisfaction, on the streams studied, does not seem justified. Ultimately, the recreation manager is still left with the difficult decision of deciding how much and what kinds of use are acceptable for a given area." My reaction to this study is that generally tubers, swimmers and rafters are not looking for the same kind of experience that should be attained in a national park of such significance as the Great Smokies. The high majority of these recreationists would perhaps have been just as satisfied on the relatively urbanized surroundings of North Georgia's Chattahoochee River.

Additionally, the recurring vagueness with calculating social carrying capacities leads me to conclude that it is not the psychological encounters that need to be emphasized but the physical and biological effects of overuse that would give the researcher, resource manager, and concerned public more concrete data to develop policies in understanding levels of degradation. Emphasize wildlife depletion, species eradication, pollution levels (easily determined by scientific measurement), soil and watershed alterations, garbage accumulations, noise, graffiti, damage or increased

maintenance of backcountry shelters and other visitor enpassants. The conclusion is that more tangible verifications must be used to give park managers the tools to fight their battle on each front. If this report can offer but one bit of advice, it would be to concentrate on these unabridged signs of resources in jeopardy.

Specify Standards For Resource and Social Condition

What are the objectives of the national park system? Should the original purpose of the parks be amended to address a new set of priorities that were unforeseen a century earlier? What philosophies should be acceptable for protection of remaining wilderness resources? What modes of access should be offered to allow the visitor to experience these resources? Are buffer zones, integral vistas or industrial tourism valid concerns facing the Park Service? Have we overshot our carrying capacity?

These questions though generalized for the entire National Park System, can be addressed toward the specific dynamics that are occurring within, around and analogous to the Great Smoky Mountains National Park. There are numerous views about these issues and my conclusions and answers to the above questions can be supported by these ideals of what the parks should be valued for. Starting with Abbey (1969), he gives

one 'ideal' that may be too late to implement on a large scale:

No more cars in national parks. Let the people walk. Or ride horses, bicycles, mules wild pigs-anything-but keep the automobiles and the motorcycles and all their motorized relatives out. We have agreed not to drive our automobiles into cathedrals, concert halls, art museums, legislative assemblies, private bedrooms and the other sanctums of our culture; we should treat our national parks with the same deference, for they, too, are holy places.

Once people are liberated from the confines of automobiles there will be a greatly increased interest in hiking, exploring, and back-country packtrips. Fortunately the parks, by the mere elimination of motor traffic, will come to seem far bigger than they are now-there will be more room for more persons, an astonishing expansion of space.

Sax (1980) especially agreed with the last part of Abbey's statement: "Places become much bigger when we are on foot, and a slower pace enlarges the material on which to expend our leisure."

The simple concept of "leisure" in itself has been warped by the age of technology. "The greatest contributions to civilization are made principally in leisure, not by ratio or mental work but by contemplative, intuitive, religious, or romantic responses to a release from travail" (Shepard, 1967). Continuing this thought, Robert Marshall said, "The wilderness (and the environment of solitude) is a natural mental resource having the same basic relation to man's ultimate thought and

culture as coal, timber and other physical resources have to his material needs." (Kauffman,1992)

Eckersley (1992) had an even more provocative description of the essence of leisure: "the more we have mastered necessity, the more we can become truly free and realize our individuality through creative leisure, the science and the arts, convivial activity, and the like...freedom lies in eros and play, not labor, for labor presupposes the suppression of instincts and the conquering of desire."

To further understand the value of natural resources and the coalescence of leisure, sometimes a harsh look at how this union has diverged must be established. Manes (1990) equated technology as the antithesis of human power, "...technology represents a relationship between humanity and the world, a portrayal of the entirety of existence as a standing reserve of raw material valuable only insofar as it augments human power. Technology totalizes existence along one axis, the axis of utility, and all the other rich, poetic, wild ways in which a human being is able to encounter the world are excluded."

There are even opinions that with all the advances in medicine today, the larger aggregate trends reveal that the general health of civilization as a whole has declined with the rise of technology. Cohen (1989) reported that sedentary, urban dwellings promote more disease than rural areas, and

that "epidemic viruses could not be transmitted continuously in a world populated entirely by relatively small groups connected by foot travelers without large urban systems to provide a reservoir of infection and civilized transportation to move them." He adds that "The best evidence demonstrating that isolated groups had no prior exposure to epidemic diseases is the devastating effect that exposure to Western colonization appears to have had on those populations."

Carson (1962) expressed a more foreboding opinion:

The new environmental health problems are multiple-created by radiation in all its form born of the never-ending stream of chemicals of which pesticides are a part, chemicals now pervading the world in which we live, acting upon us directly and indirectly, separately and collectively. Their presence casts a shadow that is no less ominous because it is formless and obscure, no less frightening because it is simply impossible to predict the effects of lifetime exposure to chemical and physical agents that are not part of the biological experience of man.

The most serious review of technologic expansion comes from Mumford (1964) in which he develops his theory that with more technology comes the depletion of human identity:

Not merely does technology claim priority in human affairs; it places the demand for constant technological change above any considerations of its own efficiency, its own continuity, or even, ironically enough, its own capacity to survive. To maintain such a system, whose postulates contradict those that underlie all living organisms, it requires for self-protection absolute conformity by the human community; and to achieve that conformity it proposes to institute a system of total control, starting with the human

organism itself, even before conception has taken place. The means for establishing this control is the ultimate gift of the megamachine; and without submergence in the subjective 'myth of the machine,' as omnipotent, omniscient, and omnicompetent, it would not already have advanced to its present state.

The heart of the problem was put less dramatically, but more succinctly by Frome (1992): "There are too many people in the parks at a given time, spending only hours where they should spend days learning to appreciate and understand the natural systems, and themselves in the process of doing so." He further advised to "find a way" (inferring great difficulty) of calculating each individual park's human carrying capacity and limit the number of visitors to provide optimum enjoyment rather than maximum use. This is done in some backcountry wilderness areas by the use of permits at certain times of the year. For example, Linville Gorge Wilderness, North Carolina has a permit policy from April 1 to November 1 each year.

Politically, the standards for resource and social conditions at the Great Smoky Mountains National Park should be elevated through all current legislative means. MOUs (memoranda of understanding) should be used to the fullest extent. These interactive devices provide access to establish interagency communication between conflicting policies among geographically adjoining government bodies. "Nuisance Law" can be declared by national park administrators if they deem

industrial tourism is "an unreasonable interference with the use and enjoyment of land-and a public nuisance-an unreasonable interference with rights that are common to the general public" (Simon, 1988).

In reference to visibility impairment, (BART) Best Available Retrofit Technology can be employed as a strategic utilization of current legislation. This policy calls for a reconstruction or re-evaluation of an existing source that is contributing or causing visibility impairments. A supposedly BART "victory" was developed at the Grand Canyon area after conclusive studies of air pollution were exposed. As of May 1990, the Office of Management and Budget (OMB) had still not acted on the proposed rule. (Freemuth, 1991) The "integral vista" concept would work well incorporated into the BART requirements of industry.

In a final retort against industrial tourism and carrying capacity overshoot, when and if legislative avenues can be shifted toward a more preservative agenda, much hope can be channelled to the words of the Wisconsin Supreme Court in 1923. Though many decades have passed, one day it may be deemed vitally necessary to recite this as case law:

It seems to us that aesthetic considerations are relative in their nature. With the passing of time, social standards conform to new ideals. As a race, our sensibilities are becoming more refined, and that which formerly did not offend cannot now be endured. That which the common law did not condemn as a nuisance is now frequently

outlawed as such by the written law. This is not because the subject outlawed is of a different nature, but because our sensibilities have become more refined and our ideals more exacting. Nauseous smells have always come under the ban of the law, but ugly sights and discordant surroundings may be just as distressing to keener sensibilities. The rights of property should not be sacrificed to the pleasure of an ultra-aesthetic taste. But whether they should be permitted to plague the average or dominate human sensibilities well may be pondered. (Simon, 1988)

"Keener sensibilities" are what is needed in reassessing the question posed at this study's outset: To protect remaining ecosystems or continue the status quo of resource manipulation.

Evaluate and Select a Preferred Alternative

In the Great Smoky Mountains National Park, motorized visitor preferences have been significantly abbreviated by either individual tendencies or economic distractions, or both. In addition, the number of motorized visitors during summer months are unable to be absorbed without impeding on the psychologic, biologic and geomorphic variables of natural resource inventory and the derivative contemplative benefits therein. After examining visitation trends, visitor attitudes, interviewing park officials, reviewing past carrying capacity studies and evaluating alternate solutions, this thesis study proposes to close the transmountain highway

that bisects the Great Smoky Mountains National Park. Initial survey results show little socio-economic impact for surrounding areas. For example, over 80% of those classified as "Car Lodging" stated that they would have still continued their trip even without the use of the highway in question.

Numerous responses could result from this proposal:

a) The park's desire for visitors to stay longer may be enhanced by closing the highway. Both major visitor centers are located on either side of the bisecting road. The park is completely surrounded by highways that can take visitors into almost any area of the interior providing both ample scenic views and connecting with 953 miles of hiking or horse trails.

There are no major public campsites that need access via the road in question!

b) The quality of visitation will increase and the resulting quantity decrease will protect and strengthen ecosystem recovery. Shepard (1967) has an interesting hypothesis: "There is also an unexplored possibility that many of the traveling public could learn that their sought-for pleasures are not to be found in the parks, and they might voluntarily go elsewhere. The usual traveler can engage in contemplation of a geyser only so long. If the Park Service were not to divert the traveler with entertainment he might move on to complementary activity elsewhere and his hotel room and his

standing space would be available for someone else...It seems possible that much of the present tourist pressure on the parks is not so much an expression of a desire to see certain wonders as it is a function of a footloose population, high-speed automobiles, convenient highways, and the new abstract tourism that now exist."

c) An environmental precedent can be set for public review that could lead to legislative pressure on the federal government. It would be a monumental decision to close such an extensively used highway as the one that traverses the GSMNP. If it did occur, for the reasons offered in this study, it could become a catalyst for other preservation issues. It seems clear that the solutions must come from grassroots support. Working within the existing system of government (with all its shortcomings and red tape) is still the best means available for environmentalists. There must be a regular and accurate flow of information to the general public on ecological issues (Eckersley, 1992) but also a stimulation of political debate on environmental values. This includes calling into question long-standing and deeply held anthropocentric assumptions and prejudices in an attempt to establish new ways of seeing and new visions of an alternate ecological society (Catton's "Realism" for Inexorable Change) that enable people to imagine or visualize what it might be

like to live differently, and with greater ecological security.

The controversial highway dividing the GSMNP is not a new debate. It has always had its detractors. Edward Clebsch, professor of botany at the University of Tennessee explained why the transmountain road should not be there (Frome, 1992). It splits a wilderness into two parts; alters the chemical constituents of several streams causing physical damage by siltation; alters groundwater patterns for an unpredictable distance from the cuts and fills (stabilized by plants) necessary in building the roads. It also creates a barrier to the movement of animal species; provides avenues for the introduction of new pests and pathogens into the adjacent wilderness and serves as a point source for contamination and disturbance of the adjacent wilderness by people and their refuge.

David Brower, a veteran environmentalist, had his own plan when dealing with development adjacent to wilderness explaining that wilderness is a necessity to urban existence.

"It is good conservation practice, if you are going to develop, to concentrate people and leave wild land around them. People need earning territory-territory they have to earn by walking, limping, crawling, or whatever they can do. With that around them, the concentrated area is important, and I wouldn't mind so many people" (McPhee, 1971). People do not

need fresh air and sunshine half as much as they need a sense of being in command of their own minds and bodies, of planning something difficult and then doing it. The "high" that can be attained by backpacking a great distance or completing a logistically involved wilderness excursion are examples of this more aggressive form of recreational contemplation. Through the contemplative eye, character and confidence can join with the idealism of higher thought. National parks can represent opportunities for worship in which one comes to understand more fully certain of the attributes of nature and its Creator. They are not objects to be worshipped, but they are altars over which we may worship. (Runte, 1987)

Implications of Closing the Transmountain Highway

The proposal of this thesis to close the transmountain highway across the Great Smoky Mountains National Park is but one step in what Reisner (1986) called "undoing the wrongs caused by earlier generations doing what they thought was right." The prevailing challenge is to change how everyone thinks; the "Osthricism", "Cynicism", "Cosmeticism", and "Cargoism" of today's American culture.

Closing one road across an ecosystem as valuable as the Great Smokies can be a major breakthrough in the process, but

in the long run has to be realistically viewed as just the tip of an environmental iceberg. The other 9/10ths of that iceberg is in rediscovering what the purpose of the national parks is for and acknowledging the big picture status of remaining wild lands. Foreman (1992) gave an up-to-date accounting of this remaining inventory of American wilderness:

Today, approximately 9 percent of the land area of the contiguous forty-eight states is still "wild", that is, in a wilderness condition as defined by America's only federal Wilderness law. Section 2(c) of the 1964 Wilderness Act defines wilderness as an area 'untrammelled by man...retaining its primeval character and influence...which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable...(and which) has at least 5,000 acres of land...'

To put this in perspective, 5,000 acres equals about 8 square miles. That's not very large. At an average walking pace in gentle terrain, one could cross a 5,000-acre square in about an hour. Today, most of America's remnant wildlands are wild only relative to the industrial wasteland surrounding them. Even most of today's ostensible big wilderness-areas of 100,000 acres or more (50,000 acres or more in the East)-are far too small to be considered wilderness in the real, biological sense of the term. One hundred thousand acres is about 156 square miles, or the equivalent of a 12-by-13-mile rectangular block of country. That is not nearly large enough-unless adjacent to other wildlands-to harbor a complete representation of native flora and fauna, including top-trophic-level carnivores, such as wolves Mountain Lions, and Grizzlies. To illustrate the smallness of even our biggest wildernesses, there is no place in the contiguous forty-eight states farther than 21 air miles from a constructed road.

Nonetheless, he added that all remaining wildlands, however small and incomplete are important in that they provide habitat for a multitude of species, reservoirs of genetic

diversity, and the opportunity for human creativity and enlightenment.

Weiner (1990) foresaw coming struggles with wildlife protection within these remaining wilderness areas. He found in recent studies that even the giant parks of the West are experiencing large species eradication. If these parks are too small, what about the parks of the East?

This is an important comparison of how the Great Smoky Mountains National Park relate to ecological concerns on a grand scale. Considering its proximity to large, urban, fast-growing metropolitan regions such as Atlanta, Georgia; Greenville-Spartanburg, South Carolina; Charlotte-Asheville, North Carolina; Knoxville, Tennessee; along with the immediate industrial tourism towns, the threats are magnified respectively. Just because there may be a trend that the Great Smoky Mountains National Park may be losing visitors to surrounding environs during summer months, the compounded stress of human activity around its borders can eventually become as much of a threat than an overabundance of visitors within its boundaries.

Interspersed among the urban sprawl is the fact that logging has doubled on the surrounding National Forests in the last ten years via an additional 1400 miles of logging roads. (Wolke, 1992) On-going petitions (Table 6) against this activity can produce measurable results that have in the past

Table 6: Sample Public Petition for Clayton, Georgia Region

Petition

for

Interim Management

return by January 7, 1995

sponsored by: Chattooga River Watershed Coalition,
PO Box 2006, Clayton GA 30525
(706) 782-6097

We the undersigned are concerned that current management of our national forest in the Southern Appalachian mountains is based on outdated Forest Plans. These plans are destroying our native forest. We appeal to Regional Forester Joslin to implement interim management guidelines until new, scientifically sound Forest Plans are in place. We urge the Forest Service to follow the direction of their own chief, Jack Ward Thomas: "Experience indicates that there is generally sufficient latitude under existing Forest Plans to modify, defer and reschedule management practices in response to specific concerns that arise."

We request:

- 1) No conversion of hardwood forests into pine plantations, and begin restoration of our native forest.
- 2) No new roads in our already heavily roaded forests.
- 3) Inventories, beginning immediately, to ground-truth current information about our forest, and to identify old growth and roadless areas.
- 4) No cutting of old growth timber (stands over 100 years old), and no road building in roadless areas.
- 5) No timber harvesting or road building in areas identified as critical habitat for sensitive, threatened or endangered species.
- 6) In areas appropriate for timber harvesting, employ only methods that mimic natural disturbances, such as single-tree selection and small group selection.

Name

Address

suspended, and in some cases prevented, projects that have not been adequately explained to the public of both their economic and ecologic consequences. Petitions can be a useful tool if enough time and support is installed in the process.

So what are the national parks for? We know they were created for public enjoyment. We know they are monuments to unique natural wonders. Many include some of our last remaining wildernesses. But what value should they supply to the visitor's demand? Sax (1980) provided a four-part answer to this question:

1. The parks are places where recreation reflects the aspirations of a free and independent people.

- They are places where no one else prepares entertainment for the visitor, predetermines his responses, or tells him what to do. The parks provide a contrast to the familiar situation in which we are bored unless someone tells us how to fill our time. The parks are places that have been tamed, contemporary symbols for men and women who are themselves ready to resist being tamed into passivity.

2. The parks are an object lesson for a world of limited resources.

- In the national parks the visitor learns that satisfaction is not correlated to the rate at which he expends resources, but that just the opposite is true. The parks promote intensive experience, rather than intensive use. The more one knows, searches and understands, the greater the interest and satisfaction of the park experience.

3. The parks are great laboratories of successful natural communities.

- We look at nature with awe and wonderment: Trees

that have survived for millennia; a profusion of flowers in the seeming sterility of the desert; predator and prey living in equilibrium; undiminished productivity and reproduction, year after year, century upon century. These marvels intrigue us, but nature is also a model of many things we seek in human communities. We value continuity, stability, and sustenance. And we see in nature attainment of the goals through adaptation, sustained productivity, diversity, and evolutionary change. Our interest in preserving natural systems is not merely sentimental; it rests on preservation of nothing less than an enormous knowledge base that we have no capacity to replicate. To some these are merely practical benefit; to some, they suggest ethical imperatives. Whatever our final characterization, nature provides an unequaled storehouse of material for human consumption

4. The parks are living memorials of human history on the American continent.

-For the most part, the national parks demonstrate the continuity of natural history measured over millennia. The less dramatic span of human settlements is an equally essential part of that history, and the national park system is a richly endowed showcase of our history as a people. These places are essential to the aspirations of a free people, for without our history we are at large and vulnerable in the present.

Raising the sights and standards of society, by appealing to and servicing the higher emotions of humankind, is the singular mission of the national parks. They are schools of awareness, personal growth, and maturity, where the individual learns to appreciate the sanctity of life and to manifest distress and love for the natural world, including the human portion of it. Frome (1992) proposes a "regreening" process to be administered to every park, focusing on the geomorphic and ecologic life systems before the welfare of commerce and

crowds. "Compromise of principle with expediency is no way to run national parks...The future of the national parks will never be established, the parks will never be secure, until the country recognizes and corrects the wrongness of its old national agenda. America needs to reclaim its wholeness in order to save its best parts."

If the contemplative sense of human behavior is not the primary response while experiencing a national park, then the intent of purpose needs to be re-evaluated, not for only the park's sake, but in that specific visitor's spatial confrontation with leisure.

CONCLUSION

The Great Smoky Mountains National Park is worthy of preservation to the highest degree. The biological resources alone justify that status. This does not mean *no use* by the public, it means more *sensible use*; more management in one sense and absolutely no management in another.

There is not enough wilderness left in the world to substantiate economic and technologic growth at current rates.

There is nothing wrong with progress (making something, even a machine, more efficient), but growth for the sake of growth, for the sake of an ignorant population expansion, or for the sake of greed, is to this author unacceptable. The amusement explosion of Pigeon Forge, Tennessee is growth, not progress.

This study has found that the majority of visitors to the Great Smoky Mountains National Park are equally satisfied by these carnival-type attractions located at both prominent entrances to the park. Revenue and visitation trends confirmed this conclusion. Pollution levels caused by too many automobiles in a limited area has frequently visually impaired the scenic grandeur of the park during summer months and park officials yearn for more informed visitors and have made attempts in creating educational opportunities at the two visitor centers. In summary, logging, industrial tourism, crime, litter, wildlife poaching, noise, traffic congestion

and a public in a hurry to go nowhere have jeopardized the integrity of the park. In other words, the load of visitors has passed the carrying capacity of the GSMNP. Therefore, in an attempt to restore the integrity and rethink priorities and purpose for the park, highway U.S. 441 should be closed, or possibly highly restricted for purposes of rescue or other official needs. For those who go to the park backpacking or car-lodging, closing the road has minimal impact. Therefore, it may promote visitors to stay longer in the park. world must

The Park Service must shed its platform of moderation in dealing with threats to its resources and heritage. It must reprioritize the values and purpose of its existence, then proceed forcefully with demanding its legislative authority for action and appropriate change. Its success will depend on public support.

The ecological system functions on intricate, finite limitations. There is hesitation to use the word "fragile" except in the sense of how most human-made machines are fragile, and that the ecosystem is also like a machine: if you take out a few parts, the machine still runs, but not as well.

And if you take out another part, one that may rely on another: how will you know when the machine will break? (Tankersley, 1993)

Just as the National Environmental Policy Act (NEPA) was established in 1969 to "encourage productive and enjoyable

harmony between man and his environment," likewise, the responsibilities of the Park Service fall under this umbrella.

"The national parks are developed so as to permit their use and enjoyment without destroying their original splendor or historic values."

In determining the point at which "values" are destroyed, especially when irreplaceability is a factor, there must be a slant toward ecologic preservation rather than economic conservation. Human interaction with the natural world must be held in higher regard than man's indomitable pursuit of growth.

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