

University of Wisconsin – Madison/Extension  
*Department of Urban and Regional Planning*

**Providing opportunities for  
outdoor recreation:**

**Standardizing county-level supply elements as a  
component of the 2005-2010 Wisconsin SCORP**

Working Paper 05-1  
October, 2005

Dave Marcouiller and Jeff Prey

Version 1.3  
October 18, 2005

# **Providing opportunities for outdoor recreation:** Standardizing county-level leisure supply elements as a component of the 2005-2010 Wisconsin SCORP

Dave Marcouiller and Jeff Prey\*

Working Paper 05-1

Department of Urban and Regional Planning  
University of Wisconsin - Madison/Extension

October 2005

**Abstract:** While the demand aspects of publicly provided recreation have long held the spotlight of research, the supply side of public recreation components remains inexact and relatively unexplored. In this report, we focus on supply components of recreational resources in Wisconsin. The supply of recreational resources is a complex combination of natural amenities and recreational sites which are influenced by an array of factors that act to provide opportunities which satisfy recreational needs and desires. Measures of recreational site density are a critical first step in analyzing supply and need to account for both physical/geographic size and population, or social capacity. In an effort to assess recreation supply in Wisconsin, we present county-level data analyzed using alternative indices that speak to referencing amenities and recreational sites within a broader regional context. Results suggest that measures of recreational carrying capacity vary widely depending on the metric used and that capturing a broader geographical realm is critical to understanding the spatial supply patterns of amenities and certain types of recreational sites.

---

\* Marcouiller is a Professor with the Department of Urban and Regional Planning at the University of Wisconsin - Madison and Prey is a Senior Planner with the Wisconsin Department of Natural Resources, Bureau of Parks and Recreation. This research was made possible with funding from the Wisconsin Department of Natural Resources - Bureau of Parks and Recreation and relied on the assistance provided by Tobi Rutten and Jamie Radel. In addition, we extend appreciation for collegial review comments of Dan Veroff and Richelle Winkler but forward the notion that any errors, omissions, misinterpretations, or implications contained in this report are solely the responsibility of the authors and do not reflect policy positions of public agencies.

# Providing opportunities for outdoor recreation:

## Standardizing county-level leisure supply elements as a component of the 2005-2010 Wisconsin SCORP

### Table of Contents

<u>Section</u>	<u>Page</u>
Table of Contents .....	iii
List of Tables .....	iii
List of Figures.....	iii
I. Introduction .....	1
a. Public recreation planning and supply .....	2
b. Importance of regional planning analysis focused on recreation supply .....	4
II Methods .....	6
a. Tracking the supply of recreation resources .....	7
b. Data on recreation supply .....	9
The experience of other States .....	9
The Wisconsin 2005-2010 SCORP data .....	11
c. Standardizing supply components.....	15
d. Extending the recreation location quotient .....	17
III. Results and Discussion .....	21
IV. Summary and Further Research Needs .....	23
Literature Cited .....	25

### List of Tables

Table 1. Supply data elements .....	13
Table 2. Recreation location quotients by supply type for Wisconsin recreation planning regions.....	22

### List of Figures

Figure 1. Recreation planning regions in Wisconsin.....	14
---	----

# **Providing opportunities for outdoor recreation:**

Standardizing county-level leisure supply elements  
as a component of the 2005-2010 Wisconsin SCORP

## INTRODUCTION

A large component of recreation and tourism planning works to match the availability of recreational sites with the needs and desires of people. In the private realm, this is done within a market framework with an ability of the provider to exclude use based on market prices. Public recreation planning, on the other hand, mimics the desires of the voting electorate and acts to develop fundamentally non-marketed recreational goods and services. In the public realm, recreation planning is accomplished by providing common-pool, publicly-owned resources based on political will within fairly rigid and constrained fiscal resources.

While the demand aspects of publicly provided recreational sites have long held the spotlight of research, the supply side of public recreation components remains inexact and relatively unexplored (Hall and Page 2002). In the work reported here, our focus is on the supply components of recreational resources. The supply of recreational resources is a complex combination of natural amenities and recreational sites which are influenced by an array of factors that act to provide opportunities which satisfy recreational needs and desires (Kretuzwiser 1989; Marcouiller and Prey 2005). Implicit to this definition is a continuum ranging from biophysical resources to developed (or built) facilities.

One critical yet unresolved issue of recreation production (or supply) is the importance of publicly provided and non-marketed natural amenities. These publicly provided goods and services tend to be hidden from view due to their non-priced attributes (Leiper 1990 ; Smith1998; Marcouiller and Clendenning

2005). As noted in the early seminal work of Clawson and Knetsch (1966, page 89):

“There is nothing in the physical landscape or features of any particular piece of land or body of water that makes it a recreation resource; it is the combination of the natural qualities and the ability and desire of man to use them that makes a resource out of what might otherwise be a more or less meaningless combination of rocks, soil and trees.”

Given this broad perspective of recreation supply, the need to separate and focus analysis on both natural amenities and individual recreational sites becomes obvious. These latter amenity-based public goods defy empirical analysis due to their non-priced and common-pool characteristics, but their characteristics do matter in many leisure and recreational products. For example, a quiet forested campsite along a lake is different from a campsite along a heavily trafficked interstate. The campsite itself is only a portion of the recreational product. Indeed the surrounding land use, the forests or water resources, and the environment dramatically affect the camping experience. Amenity-based public goods such as forests and water serve as latent primary factor inputs into the production process of recreation and tourism. Although some sectors of amusement-based recreation, such as theme parks or water parks, require few if any latent environmental inputs, outdoor and nature-based recreation are based on environmental resources and facilities play a secondary role (Hall and Page 2002; Marcouiller 1998; Dissart 2003).

### **Public recreation planning and supply**

Planning for recreation encompasses a broad set of activities ranging from physical site planning and environmental resource management to budgetary analysis based on economic and social benefits. One important overarching role

of planning is to equilibrate the regional supply of recreation resources with their respective demands within the context of protection and maintenance of the physical resource base. When recreational demands and public recreation supply are out of balance, efforts can and should be directed toward improving the supply-demand match. Effective recreation planning requires the integration of policies and actions of governmental agencies, non-profit organizations, and commercial enterprises (Gunn 1994). In the United States, the Statewide Comprehensive Outdoor Recreation Planning (SCORP) process performed by most state resource agencies every five years attempts to address both demand for and supply of publicly provided recreational resources. . For instance, Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP) is viewed as an important example of applying recreation supply capacity techniques within a planning framework. In a similar vein, Oregon's SCORP work with inventory of recreation supply provides another good example.

The Florida SCORP provides an analysis of supply capacity. The authors of this work contend that a focal point of outdoor recreation planning is the quantitative comparison of outdoor recreation demand against the supply of recreation resources and facilities at a given point in time. Spatial imbalance exists where demand exceeds supply. An admitted shortfall of Florida's quantitative analysis of recreation supply and recreational demand is that outdoor recreation demand figures are computed based on resident population, and a "shortage" of a resource or a facility in one community, city, or county may not be apparent because of a surplus in a neighboring jurisdiction or an uncaptured demand source located outside of the region under examination (State of Florida, 5-4). Simply stated, there remains a great need to develop estimates of supply and demand that account for broader geographies and capture the driving influence of urban populations.

Delineating recreation supply often boils down to an ad-hoc exercise (Smith 1999). Gunn (1994) outlines five broad categories of supply: attractions,

transportation, services, information, and promotion. These components are controlled by government agencies, non-profit organizations, and private business interests. These components tend to be dynamic, interdependent, and difficult to coordinate; greatly influenced by external factors such as natural resources, cultural resources, entrepreneurship, finance, labor, competition, community, governmental policies, organization, and leadership.

### **Importance of regional planning analysis focused on recreation supply**

The supply of recreation has important developmental dimensions. At the community level, outdoor recreation and tourism appeal as development strategies because of general increases in leisure demand, changing rural/regional economic patterns, perceptions of tourism as a clean industry, relatively low capital requirements for business, and other community development benefits (Frederick 1993; Power 1996; Marcouiller 1997; Dissart 2003). Gateway communities, or those communities that are closely proximate to public recreation destinations, are grappling with complex and traditionally unfamiliar growth management issues (Howe, McMahon, and Probst 1997; Marcouiller, Olson and Prey 2002). Indeed, the presence of natural amenities, the supply of recreational sites, and the promotion of recreation as an economic growth engine through tourism is rarely a developmental panacea and may have adverse effects on income equality, social health, and the environment (Rothman 1999; Power 1996; Marcouiller et al. 2004; Kim et al. 2005).

The issue of recreational supply is taking on an increasing sense of urgency as open and publicly accessible lands experience increased pressures. As rural landscapes become fragmented by private residential developments, the extent and quality of publicly accessible recreation lands becomes increasingly scarce. The effects of this transition act to constrain the supply of recreation land and facility development (State of Wisconsin 2000).

With technological progress and increases in disposable incomes, the last twenty years has seen a dramatic increase in alternative recreational uses of land. Jet skis, all terrain vehicles (ATVs), and skateboard parks are all new hallmarks of outdoor recreation; many of which generate significant conflict. With this alternative set of recreational activities come an increasing number of antagonistic recreational pursuits that compete for the same limited recreation land resources. A specific planning focus on intra-recreational use conflict becomes a glaringly obvious component of interest to the general public as voiced through the prior planning processes (State of Wisconsin 2000). Recreational conflict is a confounding element associated with recreation supply. Certain recreation activities interact with others in less than compatible ways. Conflict management is necessary so that recreation resources can be protected and most equitably enjoyed. Effectively managing recreational use conflicts entails an understanding of how alternative recreational uses interact. A logical approach to managing recreational conflicts might involve maximizing those uses thought to be complementary and supplementary while segregating those uses that are competitive and antagonistic (Clawson 1974; Marcouiller and Ellefson 1987; vanKooten 1992; Marcouiller, et al. 2005). Although it is recognized that intra-recreational use conflict poses a serious caveat to recreation and tourism supply analysis, there exists a dearth of useful approaches that allow its incorporation into standardized metrics of carrying capacity or recreation supply.

Public recreation planning activities need to take on a comprehensive and balanced view that incorporates both demand and supply sides extending beyond its site specific facility planning tasks to the incorporation of a regional context. Guidelines that promote integration of recreation and tourism within broader regional goals and objectives should be stressed (Clawson and Knetsch 1966; Gunn 1994; Marcouiller 1997; Hall and Page 2002). If recreation planning continues to revolve around the increasing, dynamic, and often capricious



demands of recreation, without maintaining and/or increasing the supply of recreation resources, the ability of those in the future to enjoy the same level of recreation amenities comes into question.

This paper is organized into three subsequent sections. The first section outlines both the data on recreation supply and the alternative analytical approaches used in developing recreational supply indices. The next section presents the descriptive results for 190 key recreation supply components in Wisconsin and, when appropriate, by relative ownership categories. The final concluding section outlines relevant implications for policy and presents a framework for future research that addresses recreation supply.

## II. METHODS

An array of qualitative and quantitative approaches exists to address recreation supply (Smith 1994; Ioannides and Debbage 1998; Hall and Page 1998; Schaffer 1999). The supply elements of recreation and tourism resources are inextricably intertwined. While those recreating are not necessarily tourists, recreation and recreation facilities often serve as tourist attractions. The literature background from this paper borrows heavily from sources intended for tourism planning. For example, Gunn (1994) wrote a seminal handbook on the basics of tourism supply while Hall and Page (2002), Smith (1998) and Marcouiller (1997; 1998) provide current analysis and alternative viewpoints of supply side tourism and recreation planning.<sup>1</sup>

---

<sup>1</sup> With respect to the analysis found in this paper, the fugitive literature also contains important background. For example, Holland (2003) compared the population ratios for recreation facilities of Florida counties and Illinois park districts, which are considered to have above average supply. A planning report by the Southeastern Wisconsin Regional Planning Commission (SEWRPC 1977; Appendix A) suggests some objectives, principles, and actual population and areal standards for recreation facilities. These are examples of work often found in state specific reports done as a part of comprehensive outdoor recreation planning processes.

## Tracking the supply of recreation resources

Recreation sites evade generalized characterization. For example, the range of sites considered to have leisure opportunities includes an open field or a picnic site to a multi-million dollar water park. A recreational facility is a site specific development that either provides its own amenity (e.g. an amusement park or museum) or allows access to surrounding amenities (e.g. boat launch onto a lake or campsites in a forest). The former typically entails significant financial capital to develop the amenity while the latter typically substitutes the surrounding amenity value (often publicly provided) for financial capital. Sites and facilities fall generally under Gunn's (1994) "attractions" category for the components of recreation supply. Providers of recreational sites and facilities, as well as the other components of recreation supply, can be categorized by ownership group including private, public (government agencies at local, state, federal levels), and non-profit organizations.

The recognition of recreational resource supply typically is accompanied by an inventory process that assesses the quantity, quality and extent of the resource base (Hall and Page 1999). Although no definitive scheme exists for classifying recreational resources, the need to distinguish between built and naturally occurring amenities, useful initial groupings address alternative environments and resource types. For instance, Chubbs' (1981) classification includes six elements:

- The undeveloped recreation resources, where physical attributes of land, water and vegetation are untouched;
- Private recreation, such as second homes, resources owned by quasi-public organizations;
- Commercialized private recreation resources, such as shopping malls, theme parks, museums, gardens, and resorts;

- Publicly owned recreation resources, including parks, sports and leisure facilities, national parks, forest and tourist sites;
- Cultural resources, based in both the public and private sector, such as libraries, the Arts and what is increasingly being termed 'the cultural industries';
- Professional resources, which may be divided into the administrative functions for recreational provision and management.

Variables in a typology might include urban and rural resource-based, intermediate and user-oriented, man-modified and natural resources; formal and informal; intensive and extensive; fragile and resistant; and public and private ownership (Hall and Page 1999).

The spatial aspect of supply is also an important dimension in the supply of recreational opportunities. Coppock and Duffield (1975) recognize the spatial separation between users of recreation (demand) and the presence of amenities and recreation sites (supply). Matching these demands with supply of recreation reflects important locational components and spatial patterns reflective of underlying resource endowments. These endowments include both natural (hills, lakes, forests) and socioeconomic resources (undeveloped land, available skilled labor and financial capital). In this way, we can recognize that supply is often unable to spatially respond to demand. The location of recreation facilities has been referred to as 'site preferred' goods, where proximity to their location is often seen as a measure of their use (Austin 1974). The tension in recreation planning involves balancing the location of recreation supply with the distance people have to travel and providing access to as many people as possible. Certainly, infrastructure (roads and transportation corridors) and recreational access are inextricably intertwined thus providing a broad set of coordinating tasks. Also, it is important to recognize that certain recreational endeavors require remoteness and inaccessibility as a precondition for their existence.

Wilderness and deep-woods canoeing or hiking are recreational examples where increased use can detract from the resource itself.

### **Data on recreation supply**

The USDA Forest Service has been actively involved in recreation supply planning for the past 50 years. Since the 1980s, there has been a nationwide effort to standardize data on recreation supply. Today, the National Outdoor Recreational Supply Information System (NORSIS) data set developed and maintained by the USDA Forest Service's Wilderness Assessment Unit, Southern Research Station at Athens, Georgia provides one of the few standardized sources of data for recreation in the United States. This database is a record of roughly 450 different amenity and recreation site variables for every county in the country. It contains a wide array of amenity attribute measures, including everything from American Business Index's number of archery ranges per county to the USDA Forest Service's measure of wild and scenic river miles per county. Unfortunately, its ground-truthing for accuracy, regular updating, and ownership specificity remain significant issues for further refinement and additional research. This said, it remains as the only national recreational dataset in which a base reference point can be established.

The experience of other States. The State of Oregon more widely categorizes providers of public and private-sector recreation organizations that provide outdoor recreation opportunities for the general public. Oregon classifies each recreation provider into one of eight major recreation supplier categories. Major recreation supplier categories are comprised of federal, state, county, municipal, other public, public schools, utilities, and private providers (State of Oregon 2001; 2003). A central component of Oregon's statewide recreation plan is the quantitative comparison of outdoor recreation supply and demand of existing recreation resources and facilities. Data collected over a period of 10 months by the Oregon Parks and Recreation Department staff

included outdoor recreation resource and facility information from public and private-sector recreation providers in the state. In total, outdoor recreation resources and facilities information from 1,622 outdoor recreation providers was collected. Results are presented at the county, regional, and statewide levels.

Outdoor recreation settings are also a classification that is important because they comprise a major portion of most recreation experiences. In Oregon, participants were asked to indicate the setting where they did their favorite activity and the setting they would prefer to do it in. The nine outdoor recreating settings were on a scale of decreasing primitiveness. The nine groups (decreasing in wildness) are *primitive*, *semi-primitive*, *roaded natural*, *roaded modified*, *rural*, *highly developed*, *nature-dominated within urban*, *park-like within urban*, *facility-dominant within urban*. *Primitive*, on the wildest side of the spectrum, is defined as an unmodified, natural setting where you will meet few, if any, other people. Access is cross-country travel to fairly difficult trails where motorized use is prohibited. Recreation facilities are generally not provided. *Rural*, in the middle of the scale, is defined as rural area where development such as farms, houses, stores, or equipment is commonly visible. Access is by paved road and the interaction between people can be moderate to high. Rustic bathrooms and showers, some electricity, lighted fields, etc., may be provided. Facilities for motorized use and parking are available. *Facility-dominant within urban*, the most developed category, is defined as predominantly built setting of pavement and structures, intended for leisure or recreation use within the urban context where one can expect a high level of interaction, management, and visitor controls. Areas may include small areas of grass, other vegetation, and/or shade trees growing within a paved area. Examples would be paved plaza parks or ornamental gardens (State of Oregon 2001; 2003).

The State of Florida (2000) has also recently completed a process whereby a thorough inventory of existing parks, open spaces and other outdoor recreation facilities was compiled. They felt it necessary to assess whether the system was

comprehensive, equitably distributed, accessible and representative of each community's natural landscape qualities. The Florida Division of Recreation and Parks maintain an inventory that provides details regarding the location, type, and size of outdoor recreation facilities and resources throughout the state. It is a planning tool for public and private recreation interests, useful in analyzing outdoor recreation and open space needs and capabilities and establishing program goals and priorities. Additional information such as maps of existing and proposed recreation resources, assessments of the conditions and qualities of existing facilities, and details of any limitations or barriers to participation and access provide qualitative measures to combine with visitor satisfaction data to provide a much detailed assessment of the ability of the system to meet current and future needs (State of Florida 2000: 2-61).

In Florida, the inventory includes all outdoor recreation facilities and resources provided by federal, state, regional, county, and municipal governments, commercial enterprises, non-profit organizations, and clubs. The Division of Parks and Recreation updates the inventory every two years. The staff mails inventory update forms to all previously inventoried providers and uses secondary data sources, including trade publications, private recreation directories and guides, and Internet web pages, to identify new providers to add to the inventory. However, there are certainly privately owned recreation resources and facilities that are not included in the private supply inventory (State of Florida 2000).

The Wisconsin 2005-2010 SCORP data. Data used in the analysis of recreation supply contained in this paper extends the NORSIS dataset framework using a set of 190 Wisconsin-specific recreational types and a specification of basic ownership categories ranging from private (2 categories) to public (15 categories). This Wisconsin-specific inventory was accomplished for

the 72 counties in the State using a variety of primary and secondary data sources and reflects the presence of recreational supply during 2004.<sup>2</sup>

The list of data elements in which the county-level inventory has been complete is summarized in Table 1. For interpretive purposes, these 190 recreation types were aggregated into a useful schema that serves the purposes of current recreation planning processes in Wisconsin. It is important to note that the schema outlined in Table 1 was developed to match the demand categories obtained in related 2005-2010 SCORP work (outdoor recreation demand surveys) conducted by the USDA Forest Service. In addition, we have assigned elements to two other alternative typologies including the Chubb and Chubb (1981) ownership-based aggregation and the natural amenity-based aggregation used by Marcouiller et al. (2004). Reporting of these alternative typologies is left as a further research need.

It is important to note that the elements in Table 1, when assessed for ownership group, have a much broader and more complex representation. Given alternative ownership groups, the dataset represents a total of 335 unique elements. This recognizes the fact that each element reflects unique ownership patterns that may, or may not, be present at the county level. A good example is the presence of parks. These have multiple ownership categories that are primarily operated by public agencies such as towns, villages, counties, and the State. Further, there are a limited number of privately operated parks run by non-profit groups. Contrast this with the array of outdoor recreation clubs across Wisconsin which are strictly private and most often operated as not-for-profit enterprises.

---

<sup>2</sup> This represents a recently completed Access dataset which is available upon request. In a nutshell, our inventory work relied on published secondary datasets available from the State of Wisconsin, federal agencies, and numerous non-profit special interest groups. In addition, we conducted a comprehensive written survey with telephone follow-ups of the approximately 1,800 local units of government found within the State of Wisconsin to obtain data on locally available publicly provided recreational sites; a set of data elements not captured in the NORSIS effort.

**Table 1. Supply Data Elements**

**Developed Land (110 Unique Elements)**

- ATV Parks [#]
- Campsites - electrical [#]
- Carnivals [#]
- Carts - motorized [#]
- Country clubs [#]
- Dirtbike/motorcross tracks [#]
- Dog parks [#]
- Equipped playground facilities [#]
- Fairgrounds [#]
- Golf driving ranges [#]
- Golf resorts [#]
- Highway wayside stops [#]
- Highway/Interstate reststops [#]
- Horseback riding stables facilities [#]
- Miniature golf courses [#]
- Outdoor theme parks [#]
- Paintball games areas [#]
- Parks [#, acres]
- Picnic areas [#]
- Seasonal/2nd homes [#]
- Shooting ranges - archery [#]
- Skateboard parks [#]
- Softball diamonds [#]
- State natural areas [acres]
- Tourist attractions & Amusement places [#]
- Trails - all types warm weather [miles]
- Zoos [#]

**Nature Based Land (22 Unique Elements)**

- Balloon rides [#]
- Campgrounds - public and private [#]
- Campsites - non electrical [#]
- Caves -accessible [#]
- Federal Refuges [acres]
- Forest reserves [acreage]
- Forested land [acreage]
- Public hunting lands [#]
- State park [acres]
- Trust lands [acres]
- Waterfowl production areas [acreage]
- Wetland restoration areas [acreage]
- Wilderness areas [acreage]
- Wildlife areas [acreage]

**Water-based (31 Unique Elements)**

- Beaches (Great Lakes) [#]
- Boat launches [#]
- Dams [#]
- Fishing piers [#]
- Flowages [acres]
- Lakes [#]
- Lakes [acreage]
- Marinas [#]
- Outdoor swimming pools - public [#]
- Shoreline
- State fishery areas [acres]
- Trails - water use [miles]
- Trout streams - accessible [miles]
- Water [acres]
- Water parks [#]
- Waterfalls [#]
- Whitewater rafting rivers [miles]

**Snow and Ice (24 Unique Elements)**

- Ice skating rinks - outdoor [#]
- Ski hills - # areas, runs, hills, vert.
- Ski jumps [#]
- Trails - winter use [miles]

**Viewing and Learning (35 Unique Elements)**

- Arboretums [#]
- Battlefields [#]
- Botanical gardens [#]
- Camps, educational/recreational [#]
- Effigy mounds & Archeological sites [#]
- Historic places [#, districts, forts, ships, villages]
- Horseback riding academies and schools [#]
- Lighthouses [#]
- Monuments [#]
- Nature centers [#]
- Observation towers [#]
- Observatories [#]
- Rustic roads [miles]



## Table 1 (con't)

### Sports - Individual (15 Unique Elements)

- Frisbeegolf courses [#]
- Golf course [# courses and holes]
- Lawn bowling clubs [#]
- Outdoor track and field facilities [#]
- Rodeo stands [#]
- Sports car tracks [#]
- Tennis courts - outdoor [#]

### Sports - Team (24 Unique Elements)

- Baseball diamonds [#]
- Basketball courts - outdoor [#]
- Football stadiums [#]
- Football teams - pro and semi-pro [#]
- Professional baseball facilities [#]
- Professional football facilities [#]
- Soccer fields - outdoor [#]
- Soccer teams - pro and semi-pro [#]
- Volleyball courts - outdoor [#]

### Private Clubs (10 Unique Elements)

- ATV clubs [#]
- Bicycling clubs [#]
- Curling clubs [#]
- Fishing clubs [#]
- Golf clubs [#]
- Horseback riding clubs [#]
- Sailing and yacht clubs [#]
- Ski clubs [#]
- Snowmobile clubs [#]
- Water ski clubs [#]

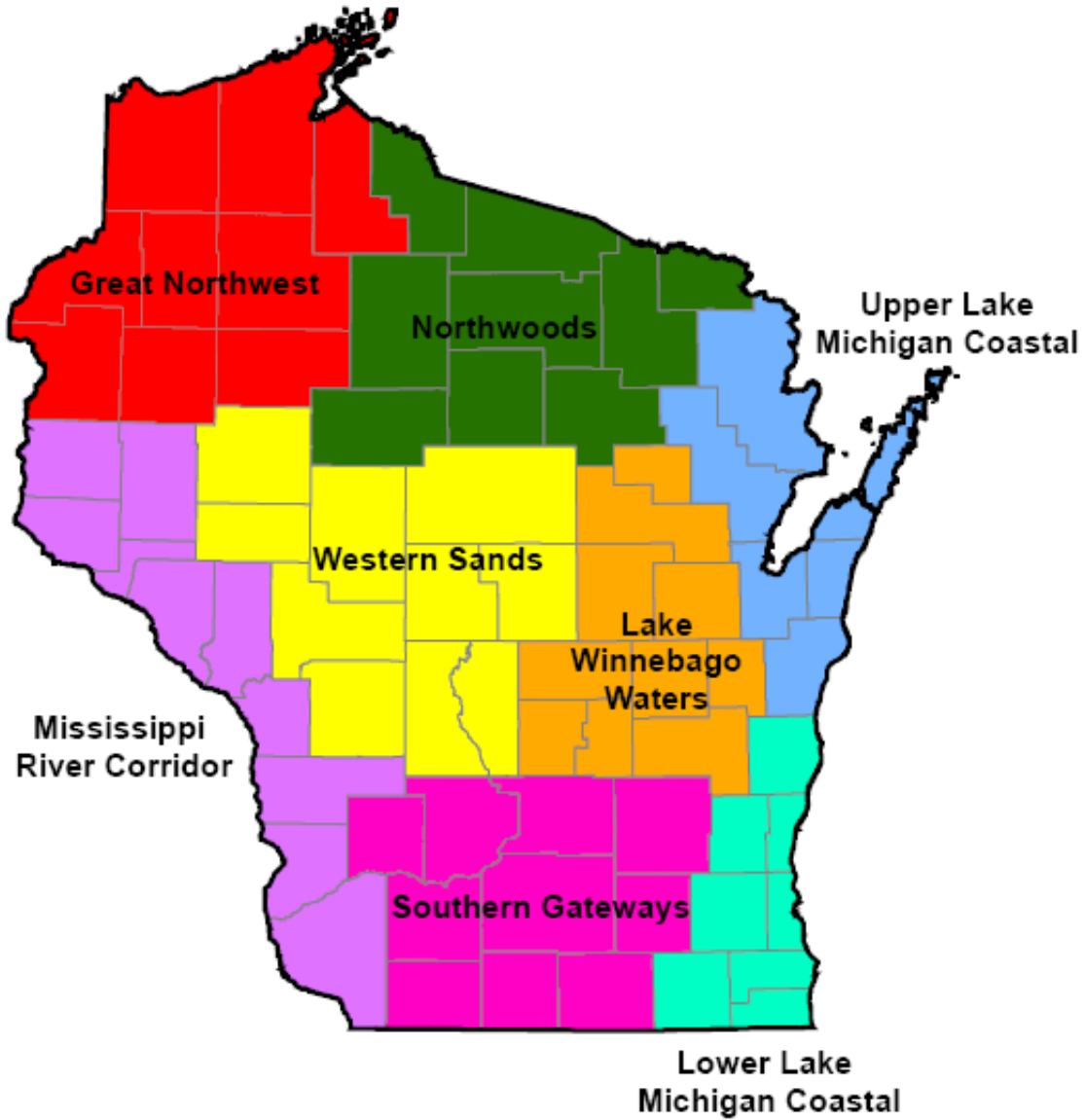
### Private Retail (35 Unique Elements)

- Archery supplies providers [#]
- ATV dealers [#]
- ATV rental places [#]
- Bed and breakfasts [# beds, rooms]
- Bicycle dealers and renters [#]
- Boat dealers, sales, service, rental [#]
- Camping equipment [#]
- Canoe - rental and charter [#]
- Circus companies [#]
- Diver's equipment & sales, retail [#]
- Fishing bait and tackle dealers [#]
- Golf equipment & supplies, retail [#]
- Guide/Charter services [#]
- Guns & gunsmiths [#]
- Horse riding & rentals [#]
- Hotel/motel [beds]
- Hunting equipment & supplies, retail [#]
- Motorcycle & motor scooter dealers [#]
- Rafting tour agencies [#]
- Recreational equipment/parts providers [#]
- Saddlery & harness [#]
- Skiing Equipment - rental and retail [#]
- Snowmobiles retail [#]
- Soccer equipment & supplies, retail [#]
- Sporting goods, retail [#]
- Tennis equipment & supplies, retail [#]
- Tourist rooming houses [#]
- Tourist rooming houses [beds]
- Watersport equipment, sales & service [#]
- Yacht charters [#]

### Sports Instruction (29 Unique Elements)

- Baseball programs [#]
- Cross-country programs [#]
- Football programs [#]
- Golf programs and instruction [#]
- Scuba and skin diving instructions [#]
- Soccer programs [#]
- Softball programs [#]
- Tennis programs [#]
- Track and field programs [#]

Further, county-level data was aggregated into the eight respective planning regions as specified by the Wisconsin Department of Natural Resources. These regional delineations are found in Figure 1.



---

Figure 1. Recreation Planning Regions in Wisconsin

## Standardizing supply components

It is important to recognize that demand and supply are fundamentally unique and are built on different units of measurement. While descriptive metrics of demand primarily focus on visitor numbers by place of origin, recreation supply represents the extent of physical resources present and some indication of capacity.<sup>3</sup> Examples of the former include the number of park acres or the number of lifts in a downhill ski hill. The latter capacity elements speak to a more detailed assessment of capacity; examples include items such as the number and size of camping sites or the uphill lift capacity in skiers per hour.

Various approaches for standardizing supply components have been forwarded. These can be generalized into two groups, those that focus on relevant market (population) and those that focus on aggregate geographic extent (areal). The first known recreation and park population ratios were of British origin in the late 1800's. Alternative ratios exist but one usable population ratio for recreation includes a simple parks-to-population ratio (Holland 2003). Using population ratios is feasible due to readily available population data. However, setting population ratio standards is not a science and can be difficult to defend against those who are resistant to public spending on recreation facilities. Holland (2003) examined population ratios in Florida and Illinois. In Illinois, a range of park districts of varying resident population which had above average numbers of recreation facilities were selected. In Florida, comparable counties with medium sized and large sized populations were selected. Illinois Park District information was accessed from a park district directory and Florida county populations and facility counts were accessed from the state's Division of Recreation and Parks. An average population ratio for the selected "medium"

---

<sup>3</sup> We recognize that there is a difference between descriptive and inferential metrics of demand and supply that differ by discipline. Examples of inferential demand metrics often include price-quantity tradeoffs (economics), biophysical limits on resource use (conservation biology), or social and cultural constraints on use (sociology). For our purposes here, we limit our analysis to descriptive metrics of supply.

and "large" population counties in both states were calculated and used as a basis for assessment.

The aggregate geographic extent of recreational sites focuses on the amount of area consumed by recreation as a primary activity. Area extent presents another useful metric for recreation supply assessments. The basis of areal estimates represent an interest in providing sites sufficient in size and number to at least meet the recreation demands of the resident population. The recreation sites should be spatially distributed in a manner which provides ready access by the resident population. Along with per capita requirements, efforts of regional recreation planning outline minimum facility land requirements, and maximum service radius requirements (SEWRPC 1977; State of Florida 2000).

These supply metrics boil down to the use of simple indices that reflect the incidence of recreational resources. Useful supply measures standardize resources by scaling them on some per unit basis. This scaling can be based on per capita or per acre basis depending on the task at hand. In their simplest form, these indices can serve as a base metric of carrying capacity. One problem associated with simple indices of local population is their use for resources that draw people into the region from the outside. It is important to recognize that there exists wide variation in demand characteristics that differ by unique recreational resource types. For instance, municipal parks (playgrounds, picnic areas, basketball courts, etc.) are typically used (demanded) by people who reside in the city. The level of use by non-locals is limited. On the other hand, popular state and federal parks (Devils Lake State Park, Yellowstone National Park, etc.) are typically used by non-locals with local use limited to off-peak times. Thus, for non-locally demanded recreation/tourism resources, there is a need a broader geography that captures a larger regional demand. This leads to alternative metrics such as the recreation location quotient.

## Extending the recreation location quotient

One limitation of the previously described analysis techniques is the general inability of the metrics to provide a relative and comparable statistic upon which to base locational decisions. This limitation points to the need for a metric that serves as an index of an index with a reference region to serve as the basis for comparison. The recreation location quotient (RLQ) is one such index of an index metric that can provide more comparable measures of a region's recreational resources. An RLQ is a measure of the relative difference in regional recreational characteristic as compared to some reference region. For recreational resources, it is simply calculated as follows (eq. 1):

$$RLQ = \frac{\% \text{ resource in a given locale}}{\% \text{ resource in a reference region}} \quad (\text{eq. 1})$$

As such, this metric provides a broader measure of recreational supply that captures wider spatial markets. Although it remains purely descriptive, it is useful in assessing where recreational resources are abundant relative to elsewhere. Measurements, to be useful, need to assess broader regional supply as it relates to local supply (e.g. relative to everyone else, how much recreation do we have here ... in this community?). Thus a RLQ provides a measure of local supply relative to some reference region to answer the question: What level of importance can we place on local recreational resources?

Specifically, the recreation location quotient is calculated as follows (eq. 2):

$$RLQ_s^i = \frac{\left( \frac{r_s^i}{pop_s^t} \right)}{\left( \frac{r_n^i}{pop_n^t} \right)} \quad (\text{eq. 2})$$

where  $r$  is the amount of recreation site capacity,  $i$  is recreation type,  $s$  is the local community,  $pop$  is population,  $t$  is total, and  $n$  is the reference region. A variant that places local resources on an areal basis can be calculated based on size as follows (eq. 3):

$$RLQ_s^i = \frac{\left( \frac{r_s^i}{area_s^t} \right)}{\left( \frac{r_n^i}{area_n^t} \right)} \quad (\text{eq. 3})$$

The implications of recreation location quotient values speak to the level of excess recreation supply. The theoretical domain of a recreation location quotient extends between zero and infinity ( $0 < RLQ < \infty$ ) but in practice, the upper bound is about 50 or so. As an example, inferences of alternative RLQ values include the following:

- RLQ = 1      →      region has same proportion of recreation type  $i$  as reference region
- RLQ < 1      →      region is producing less of recreation type  $i$  than reference region – key indicator for recreation development strategies (if appropriate)
- RLQ > 1      →      region has an excess proportion of recreation type  $i$  as compared to reference region (infers amount of non-local, or tourist, use)
- RLQ = 4      →      region has four times the level of recreation type  $i$  compared to the reference region

Again, the recreation location quotient provides a usable metric for assessing **where** recreation supply exists and doesn't exist.

Recreation location quotients have limitations. An RLQ does not allow for variations in regional tastes and preferences, propensities to consume locally, ease of access via transportation networks, income levels and employment, economies of size (agglomerative effects of urban influence), and regional comparative advantage. The overpowering advantages of using location quotients are that they provide an inexpensive and comparable statistic for examining the incidence of a characteristic in any given location.

Selecting the reference region determines the characteristics of an RLQ index. More detailed assessment and use of peer regions provides an extension of the RLQ, referred to in the regional science literature as the minimum requirements (MR) technique. In the MR approach, a reference region is selected from a peer-group of regions that can be defined based on population, density, distance from metropolitan area, or other key demographic characteristics. The MR approach assumes that set of regions comprising the peer has no excess recreational resources until local consumption needs are met. Peer-group regions that have higher proportions than the minimum devote the difference to non-local use.

The minimum requirements approach allows for homogeneous regions to be compared, which can be useful when interests include a focus on regional uniqueness. For instance, by comparing only urban areas the MR approach allows for an accounting of agglomerative effects. On the other hand, comparing only rural remote regions of like amenity bases allows us to distinguish like resource regions that are uniquely distant from major demand sources. The MR approach is a more specific alternative to the location quotient, because it measures a region with respect to a specific peer group. In the case of recreation, this can be done based upon their degree of rurality. An example of a standardized regional approach to peer groups is found in something referred to

as the urban to rural continuum code, initially developed by Calvin Beale.<sup>4</sup> Beale Codes were developed to measure this characteristic by forming a classification scheme that distinguishes metropolitan counties by size, and nonmetropolitan counties by degree of urbanization and proximity to metro areas.

For ease of presentation and because of a general lack of prior regional recreation delineations, we will only present recreation location quotients and will use the statewide Wisconsin level as our reference region. Alternative reference specifications including minimum requirements peer identification, while a component of previous Wisconsin-based tourism work (Leatherman and Marcouiller 1996), remains as a further research need.

Explanatory models used will extend and adapt previous work (English et al. 2000; Deller et al. 2001; Marcouiller et al. 2004; Kim et al. 2005) but focus more specifically on the supply of outdoor recreation (Marcouiller and Prey 2005). Given an overarching but somewhat tangential interest in making a linkage between tourism and its latent input structure, explanatory models will attempt to use the presence of alternative recreational supply types as independent variables to explain local tourism incidence to more fully substantiate previous results and research directions.

---

<sup>4</sup> The Beale Code is a USDA ERS regional typology that classifies counties into finer residential categories beyond the standard metropolitan statistical area. Particularly for the analysis of trends in non-metropolitan areas that are related to population density and metropolitan influence, this classification represents the rural-urban continuum that begins with 0, which designates a central county with metropolitan areas of 1 million population or more, and continues in rurality to 9, which designates a county that is completely rural (no places with a



### III. RESULTS AND DISCUSSION

Generally, recreation location quotients are sensitive to scale, extent of an element's presence, and reference region. For our purposes in this report, recreation location quotients (RLQs) were calculated at the most disaggregate level and then averaged to both recreation type and regional aggregate. Alternative levels of aggregation can be expected to generate varying results. Regional RLQs by the SCORP recreation typologies outlined in Table 1 are summarized in Table 2. For the interested reader, further discussion of the supply makeup of each of the eight DNR recreation planning regions are more fully described in related work.

Regional recreation supply components in Wisconsin by the 10 supply typologies as measured by population and area-based RLQ suggest some interesting locational issues that speak to how outdoor recreation opportunities are provided. The most striking result suggests that regions where demand for outdoor recreation is strong, in general, do not provide these opportunities in proportion to their size. For instance, the Lower Lake Michigan Coastal (including Milwaukee, Racine, Kenosha, and the northern Chicago-land metroplex) and Southern Gateways (including Madison) regions have overall population based RLQs less than one (.52 and .94 respectively) indicating a relative lack of recreation supply. Results suggest that less populous regions in the north such as the Great Northwest and the Northwoods have relatively abundant opportunities when based on population (population-base RLQs of 2.52 and 3.22 respectively).

In addition, an interesting aspect of these results suggest that the specific type of recreational opportunity present is largely a function of its level of urban influence. For instance, in the more urban portions of Wisconsin, our results

---

population of 2,500 or more) not adjacent to a metropolitan area. Designations 0-3 are considered metropolitan, 4-9 are considered non-metropolitan.

**Table 2. Recreation Location Quotients by supply type for Wisconsin recreation planning regions.**

Recreation Typology		Great	North-	Upper L.	Lower L.	Southern	Miss. R.	Western	Lake
		Northwest	woods	Michigan Coastal	Michigan Coastal	Gateways	Corridor	Sands	Winnebago
<b>POPULATION- Based RLQ</b>	Developed Land	2.89	3.00	1.23	0.49	0.89	1.22	1.17	1.16
	Nature Based Land	3.94	7.36	0.68	0.16	0.91	1.31	1.25	0.97
	Water-Based	4.12	5.33	2.03	0.32	0.60	1.12	0.97	0.81
	Snow and Ice	4.18	3.86	0.70	0.50	0.76	0.86	1.61	0.85
	Viewing and Learning	1.39	2.56	1.96	0.50	1.44	2.00	0.46	0.57
	Sports - Individual	1.65	1.99	0.70	0.61	0.86	1.68	1.60	1.23
	Sports - Team	1.01	1.70	1.62	0.77	1.01	1.01	0.99	1.12
	Private Clubs	2.47	3.11	1.36	0.63	0.81	1.05	1.24	0.93
	Private Retail	1.66	3.43	1.69	0.61	1.10	0.86	0.72	1.11
	Sports - Instruction	1.49	1.29	0.82	0.65	0.94	1.73	1.80	0.95
	<b>OVERALL</b>	<b>2.52</b>	<b>3.22</b>	<b>1.33</b>	<b>0.52</b>	<b>0.94</b>	<b>1.29</b>	<b>1.14</b>	<b>1.00</b>
<b>AREAL- based RLQ</b>	Developed Land	0.70	0.60	1.25	3.24	1.13	0.72	0.70	1.29
	Nature Based Land	0.95	1.48	0.70	1.02	1.16	0.77	0.75	1.08
	Water-Based	1.00	1.07	2.06	2.07	0.77	0.66	0.58	0.90
	Snow and Ice	1.01	0.78	0.72	3.29	0.97	0.51	0.96	0.95
	Viewing and Learning	0.34	0.51	1.99	3.30	1.84	1.18	0.27	0.63
	Sports - Individual	0.40	0.40	0.71	4.03	1.10	0.99	0.96	1.37
	Sports - Team	0.24	0.34	1.64	5.03	1.30	0.60	0.60	1.25
	Private Clubs	0.60	0.62	1.38	4.12	1.03	0.62	0.74	1.03
	Private Retail	0.40	0.69	1.72	3.97	1.41	0.51	0.43	1.24
	Sports - Instruction	0.36	0.26	0.83	4.23	1.20	1.02	1.08	1.06
	<b>OVERALL</b>	<b>0.61</b>	<b>0.65</b>	<b>1.35</b>	<b>3.39</b>	<b>1.21</b>	<b>0.76</b>	<b>0.68</b>	<b>1.11</b>

suggest that the primary types of opportunities present include the more urban forms of recreation such as team sports, private retail/service, and a tendency toward more viewing and learning type of recreation. This is contrasted with the more rural parts of the state where we typically find recreational resources embodied with natural resources such as land and water.

An alternative picture of recreational opportunities is presented in the areal-based RLQ. Here, results suggest that although populations are high in urban portions of Wisconsin, there are more substantial recreational resources available on a per acre basis. Of course, when combined with the previous index, we recognize that this availability does not rise to the extent of the population-driven recreational demand. Interestingly, areal-based RLQ results suggest quite similar rankings when distinguishing by recreational types with urban areas still focusing on the more urban forms of recreation --- organized sports, retail/service opportunities, and viewing and learning resources.

#### **IV. SUMMARY AND FURTHER RESEARCH NEEDS**

While the demand aspects of publicly provided recreational sites have long held the spotlight of research, the supply side of public recreation components remains inexact and relatively unexplored. In this paper, we focused attention to the supply components of recreational resources in Wisconsin. The supply of recreational resources is a complex combination of natural amenities and recreational sites which are influenced by an array of factors that act to provide opportunities which satisfy recreational needs and desires. Implicit to this definition is a continuum ranging from biophysical resources to built facilities.

At the county level in Wisconsin, we based our analysis on a county-level inventory of recreational sites. Our supply assessment took the form of

specifying ten unique recreational resource supply types and presenting their presence spatially using several alternative measures of capacity. First, each was presented using two alternative forms of a recreation location quotient. Second, these relative presence metrics were used as independent variables in explanatory models. Results suggest important spatial patterns of recreation supply across Wisconsin that account for presence in both an areal and a population-based density perspective.

It is difficult to generalize about the appropriateness of any given supply metric or individual recreational use carrying capacity without first developing an understanding of the recreation type being considered. Different recreation types will necessarily have different characteristics. For instance, a municipal playground has fundamentally different use patterns and carrying capacities as compared to state parks. Depending on the type of recreation being examined, simple indexes and local populations are satisfactory in assessing carrying capacity levels. As non-local use increases, alternative indices such as the recreation location quotient or minimum requirements approach rely on broader market regions and are more appropriate for assessing carrying capacity.

There is certainly ample opportunity for more work in this area. A related area of further work can address the development of a set of recreational use carrying capacity guidelines that incorporate economic, social, and/or environmental attributes of regions. This can begin with the use of available data and our supply analysis to spatially array Wisconsin resources. Carrying capacities guidelines can be based on an assessment of peak capacity analysis by recreation type. This is useful for prioritizing scarce public funds for the provision of new publicly provided recreational opportunities.

Another related area of further research deals with recreational use compatibility. This work needs to array alternative recreational uses in a matrix that identifies compatibility and conflict in a similar fashion to the early work by Clawson (1974). Objectives of this research need can array alternative

recreational uses with one another and seek both a literature base empirical evidence on intra-use interactions. As a beginning, it is possible to use outside research to qualitatively assess the level of intra-recreational use conflicts. In other words, what's needed are guidelines that identify levels of compatibility among the variety of recreational uses that exist today. This is the conceptual basis for ongoing work (Marcouiller et al. 2005).

Each of these further research needs can be used to provide a more comprehensive understanding of recreational supply to be matched with current and future demands. If we better understood locational attributes of recreation supply, it would then be possible to analyze critical needs in the location of public recreational opportunities spatially across Wisconsin. It is important to utilize supply and demand aspects to identify where recreational opportunities are lacking for strategic targeting of increasingly scarce public funds.

We live in a land of diverse outdoor recreation opportunities. This paper focuses on recreation supply from the perspective of both local and regional use based upon different techniques. Results suggest that measures of recreational carrying capacity vary widely depending on the metric used and that capturing a broader geographical realm is critical to understanding the spatial supply patterns of amenities and recreational sites. This type of work is logically a central feature of progressive and comprehensive outdoor recreation planning that has a basis in objective, theoretically sound, and empirically justified regional science.

#### LITERATURE CITED

Austin, M. 1974. The evaluation of urban public facility location: An alternative to cost-benefit analysis. *Geographical Analysis* 6: 135-146.

Chubb, M and H. Chubb. 1981. *One Third of Our Time? An Introduction to Recreation Behaviour and Resources*. New York, NY: Wiley.

- Clawson, Marion. 1974. Conflicts, strategies, and possibilities for consensus in forest land use and management. In: *Forest Policy for the Future*, papers and discussions from a forum on forest policy for the future, May 8-9, 1974. Washington, D.C.: Resources for the Future. pp. 101-191.
- Coppock, J.T. and B. Duffield. 1975. *Outdoor Recreation in the Countryside: A Spatial Analysis*. London, England: Macmillan.
- Deller, S.C., Tsung-Hsiu Tsai, D.W. Marcouiller, and D.B.K. English. 2001. The role of amenities and quality of life in rural economic growth. *American Journal of Agricultural Economics* 83, 2: 352-365.
- Dissart, Jean Christophe. 2003. *The Role of Outdoor Recreation in Remote Rural Economic Development Planning: An Exploratory Approach*. Unpublished Ph.D. Dissertation, Department of Urban and Regional Planning, University of Wisconsin – Madison.
- English, D.B.K., D.W. Marcouiller, and H.K. Cordell. 2000. Linking local amenities with rural tourism incidence: Estimates and effects. *Society and Natural Resources* 13, 1: 185-202.
- Florida, State of. 2000. *Outdoor Recreation in Florida: Florida's Statewide Comprehensive Outdoor Recreation Plan*. 2002. Department of Environmental Protection, Division of Recreation and Parks. Secretary David B. Struhs. Tallahassee, Florida.
- Gunn, Clare A. 1994. *Tourism Planning: Basics, Concepts, Cases*. Third Edition. Washington D.C.: Taylor & Francis.
- Hall, C. Michael and Stephen J. Page. 1999. *The Geography of Tourism and Recreation : Environment, Place and Space*. Second Edition. London, England: Routledge.
- Hass, Glenn E. 1999. *Comparative Analysis of Outdoor Recreation Capacity Programs*. 1999 Congress on Recreation and Resource Capacity. Snowmass Colorado
- Holland, Stephen. 2003. *Population ratios for outdoor recreation facility planning: Searching for an empirical basis*. Presented at: National Association of Recreation Resources Planners Conference. Milwaukee, Wisconsin. May 6, 2003.
- Howe, J., E. McMahon, and L. Propst. 1997. *Balancing Nature and Commerce in Gateway Communities*. Washington, D.C.: Island Press.

- Ioannides, D and K.G. Debbage (eds.). 1998. *The Economic Geography of the Tourist Industry: A Supply-side Analysis*. New York, NY: Routledge.
- Kim, K.K., D.W. Marcouiller, and S.C. Deller. 2005. Natural amenities and rural development: Understanding spatial and distributional attributes. *Growth and Change* 36(2): 275-298 in-press.
- Kreutzwiser, R. 1989. Supply. In: Wall, G. (ed.) *Outdoor Recreation in Canada*. Toronto, Canada: Wiley.
- Leatherman, J.C. and D.W. Marcouiller. 1996. Estimating tourism's share of local income from secondary data sources. *Review of Regional Studies* 26, 3: 317-339.
- Leiper, Neil. 1990. Partial industrialization of tourist systems. *Annals of Tourism Research* 17(4): 600-605.
- Marcouiller, D.W., Ian Scott, and Jeff Prey. 2005. Addressing recreational conflict: Developing a basis for management. Working Paper 05-01, Department of Urban and Regional Planning, University of Wisconsin – Madison.
- Marcouiller, D.W. and G.C. Clendenning. 2005. The supply of natural amenities: Moving from empirical anecdotes to a theoretical basis. In *Natural Amenities and Rural Development* edited by G.P. Green, S.C. Deller, and D.W. Marcouiller. New York: Edward Elgar Publishing.
- Marcouiller, D.W. and J. Prey. 2005. The tourism supply linkage: Recreational sites and their related natural amenities. *Journal of Regional Analysis and Policy* 35(1): in-press.
- Marcouiller, D.W., K.K. Kim, and S.C. Deller. 2004. Natural amenities, tourism, and income distribution. *Annals of Tourism Research* 31: 1031-1050 .
- Marcouiller, D.W., E.F. Olson, and J. Prey. 2002. *State Parks and their Gateway Communities: Development and Recreation Planning Issues in Wisconsin*. Monograph G3773, Board of Regents of the University of Wisconsin System, Madison, WI. 62 pages.
- Marcouiller, David W. 1998. Environmental resources as latent primary factors of production in tourism: the case of forest-based commercial recreation. *Tourism Economics* 4 (2):131-145.

- Marcouiller, David W. 1997. Toward integrative tourism planning in rural America. *Journal of Planning Literature* 11, 337-357.
- Marcouiller, D.W. and P.V. Ellefson. 1987. *Forest Land Use and Management Conflicts: A Review and Evaluation of Approaches for Management*. Technical Staff Paper No. 73, Minnesota Agricultural Experiment Station, St. Paul, MN. 86 pages.
- Oregon, State of. 2003. *Oregon's Statewide Comprehensive Outdoor Recreation Plan 2003 -2007*. Oregon Parks and Recreation Department, Corvallis, OR.
- Oregon, State of. 2001. *Oregon Statewide Outdoor Recreation Resource/Facility Inventory Bulletin*. Oregon Parks and Recreation Department, Corvallis, OR.
- Power, Thomas Michael. 1996. *Lost Landscapes and Failed Economies*. Washington, D.C.: Island Press.
- Roth, F. 1989. *On the Forestry Conditions of Northern Wisconsin*. Bulletin No. 1. Economic Series No.1., Wisconsin State Geological and Natural History Survey, Madison, WI.
- SEWRPC. 1977. *Regional Park and Recreation Open Space Plan*. Southeastern Wisconsin Regional Planning Commission
- Shaffer, William A. 1999. *Regional impact models*. West Virginia University: Regional Research Institute.
- Smith, Stephen L.J. 1998. Tourism as an industry: Debates and concepts. In: Ioannides, D and K.G. Debbage (eds.) *The Economic Geography of the Tourist Industry: A Supply-side Analysis*. New York, NY: Routledge.
- Smith, Stephen L.J. 1994. *Tourism Analysis*. New York, NY: Praeger Publishing.
- Stier, J.C., K.K. Kim, and D. W. Marcouiller. 1999. Growing stock, forest productivity, and land ownership. *Canadian Journal of Forest Research* 29, 6: 1736-1742.
- vanKooten, Cornelius. 1993. *Land Resource Economics and Sustainable Development: Economic Policies for the Common Good*. Vancouver, BC: University of British Columbia Press.



Wisconsin, State of. 2000. *Wisconsin's Statewide Comprehensive Outdoor Recreation Plan 2000 – 2005*. Madison, WI: Wisconsin Department of Natural Resources.