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The Regional Supply of Outdoor Recreation Resources: Demonstrating the Use of Location Quotients as a Management Tool

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EXECUTIVE SUMMARY: The supply of outdoor recreational resources involves a complex combination of natural amenities, public recreation sites, and private recreational activities that are influenced by an array of factors to provide opportunities for leisure experiences thus satisfying local recreational needs and desires. In this article, we demonstrate an approach to assess supply components of outdoor recreation sites and related natural amenities at the sub-state level in Wisconsin. The purpose of this exercise is to demonstrate a technique used to assess recreation supply for comprehensive recreation planning that is regionally comparative, standardized to useful base metrics, easily interpretable, and flexible to alternative regional specifications and recreation typologies. Regional measures of recreational site density are a critical first step in analyzing supply and need to account for both geographic size (physical capacity) and population (or social capacity). We demonstrate an application of the recreation location quotient using alternative indices that reference amenities and recreational sites within a broader regional context. Results suggest that locations proximate to large population centers have fundamentally different supply characteristics and generally exhibit diminished opportunities for outdoor recreation, as a whole. Further, results suggest that measures of recreational site density vary widely depending on the metric used, and that capturing broader geographies is critical to understanding the spatial supply patterns of amenities and certain types of recreational sites. This type of work is logically a central feature of proactive, objective, and comprehensive outdoor recreation planning that has a basis in theoretically sound and empirically justified regional analysis. Recreation management professionals, parks and forest administrators, and the corresponding elected public officials who make decisions about allocation of scarce public resources need to better understand locational attributes of recreation supply. The process of maintaining current recreational resources require a more informed and thorough assessment of spatially explicit locational needs. These needs vary

across state and sub-state regions. Perhaps more importantly, it would appear critical to utilize these informed regional supply metrics to set goals and to identify where recreational opportunities are lacking in the strategic targeting of increasingly scarce public funds to develop new outdoor recreation sites.

KEYWORDS: outdoor recreation, supply, metrics, measurement, location quotient, distance weighting

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"Legislators, general planners, administrators, conservationists, and citizen groups generally want answers to such questions as how much park and recreation area is 'enough' to the meet the needs of our people? What is a reasonable goal? How does our city or state compare with others?" (Clawson & Knetsch, 1966: 34)

In their classic work on the economics of outdoor recreation, Clawson and Knetsch (1966) summarized a set of overarching questions for recreation planning more than 40 years ago that remain relevant yet are only partially addressed today. Although their first question of when is enough, enough can often be obfuscated by the political process, comparative regional analyses can be readily developed to assist in setting realistic and objectively defined goals. This said, it is interesting to note that recreation supply assessments based on standardized and comparative location-specific datasets of outdoor recreation resources remain relatively undeveloped and have seen only limited application.

A central issue that adds complexity to outdoor recreation supply assessments involves the need to characterize how recreation is "produced." Indeed, the production (and hence, supply) attributes of recreation remain poorly supported by a conceptual approach that can be generalized. Outdoor recreational resources exist as a complex combination of natural amenities and developed recreational sites influenced by an array of ecological and physical factors (Clawson & Knetsch, 1966; Kreutzwiser,1989) within outputs jointly produced by a variety of public and private entities (Marcouiller, 1998; Powers, 2005; Vail & Hulkrantz, 2000). It has long been understood that recreational resources are not simple goods that can be easily characterized.

The natural resource base of a region (e.g., forest, water, wildlife, geologic resources, etc.) serves an important role as an endowment of natural amenities that act as inputs to the

production of outdoor recreation (Driver & Bruns, 1999; Stein, Clark, & Rickards, 2003). Indeed, recreational sites are often developed to provide access to these regional natural resource amenity endowments; an idea confirmed by recent empirical assessment (Dissart, 2003; Dissart, 2005; Marcouiller & Prey, 2005). Thus, meaningful metrics of supply must extend beyond recreational sites themselves and include regional metrics of the natural resource base.

The complexity of understanding recreation resource supply is further exacerbated by the inherently interconnected nature of recreation supply and recreation demand that is unique to the phenomenon of tourism.[1] There are inherent supply inconsistencies brought forward by the simple fact that producing outdoor recreation tacitly involves creating experiences of individual outdoor recreationist. Producing "experiences" (Rossman & Schlatter, 2008) through development of "experience-scapes" (Andersson, 2007; Mossberg, 2007; O'Dell & Billing, 2005) has long been seen as central to the destination "product" (Melián-González & Garcia-Falcón, 2003; Murphy, Pritchard, & Smith, 2000) and increasingly serves as a primary motivation behind demand assessments of publicly provided recreation (Hall & Page, 2006).

Many elements of recreation demand (individual motivations and needs, personal preferences, participation rates and constraints, physiological and psychological benefits, and factors affecting access to opportunities) have been studied in great detail (Driver, Brown, & Peterson, 1991; Pigram, 1983; Tisdell, 2006). Much less well understood is the incorporation of these experiential demand elements within a comparative regional supply framework of recreation resources (Hall & Page, 2006; Harrington, 1987; Marcouiller & Clendening, 2005; Smith, 1993).

Purpose of the Study

While tackling the conceptual and theoretical inconsistencies of an intertwined supply/demand framework is well beyond the scope of this paper, the recognition and integration of demand proxies within a supply framework leads us to an incrementally more thoughtful assessment of recreation supply. Pertinent to our work here, the need for comparative regional recreation resource assessments to not simply represent the spatial incidence of recreation sites but incorporate both proximity to population sources (demand) and locally available natural amenity attributes reflects an extension of supply analysis to a more advanced level.[2]

Descriptive recreation inventories remain the most widely used methods for categorizing recreation supply and are evident in documents that reflect national level analyses (Cordell, 1999; Cordell, 2004) and Statewide Comprehensive Outdoor Recreation Plans (c.f. Florida, 2002; Oregon, 2003; and others). Given the complex nature of recreation resources, these descriptive inventories rarely allow for easy comparison between regions. Thus, various approaches to standardizing recreation supply elements have been proposed that seek to give planners a basis for comparison.

In this paper, we demonstrate one such comparative regional supply assessment used in a recent comprehensive recreation planning application in Wisconsin. Much of this demonstration extends presentation of the most recent Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP) completed in 2006 (Wisconsin, 2006) and draws from a line of inquiry that has developed over the past five years that acts to link regional analysis with applications to parks and recreation planning (Marcouiller & Prey, 2005).[3] The purpose of this paper is to contribute to the renewed interest in understanding the supply elements of recreation by exploring the value of using recreation location quotients as a measure of relative recreation resource abundance and/or scarcity. Thus, we are driven by two primary objectives. First, we contribute to the conceptual development of recreation supply by forwarding a useful comparative regionalization technique. Second, we demon-

strate this technique empirically at a sub-state, multi-county level and suggest both useful policy implications and further research needs.

Method

Various approaches for standardizing supply components have been forwarded. The most common are those that look to describe the availability of recreation resources based on the extent of simple areal metrics combined with data on the resident population. Simple parks-to-population ratios were first used in Britain in the late 1800s and continue to be used today (Holland, 2003). More common is the use of acres per capita metrics (Clawson & Knetsch, 1966; Clawson, 1984; Mertes & Hall, 1995; Smith, 1993). Such metrics are often used to set recreation supply provision standards (Florida, 2002; Mertes & Hall, 1995; Oregon, 2003). Along with per capita requirements, regional recreation planning has outlined minimum facility land requirements and maximum service radius requirements (Florida, 2002; Mertes & Hall, 1995; SEWRPC, 1977).

Recreation supply assessment techniques that attempt to incorporate demand proxies have long been recognized as important because of the positive relationship between distance and travel cost (Austin, 1974; Clawson & Knetsch, 1966; Bergstrom & Cordell, 1991; Cordell & Bergstrom, 1991; English & Cordell, 1993) but standardized approaches have yet to see wide implementation.[4]

Recreation Location Quotient

The recreation location quotient (RLQ) adapts the location quotient within a recreation planning context. The location quotient is a commonly applied and practical planning tool used to understand local economic specialization and economic dependency (Shaffer, Deller, & Marcouiller, 2004). Within a recreation planning context, RLQs have been identified by Smith (1993) as a special comparative version of per capita recreation supply measures. An RLQ is a measure of the relative difference in regional recreational characteristics. The reference region can be defined based upon planning need and is useful to demonstrate here for two reasons. First, the RLQ is not well understood nor widely applied in the recreation planning profession, thus further demonstrations are useful. Second, the RLQ provides a comparative regional supply metric that can capture, by proxy, the potential of local demand (resident population). Adaptations can extend regional references to infer non-local demand (proximity to larger population centers).[5]

For recreational resources, the RLQ is calculated as follows (Equation 1):

$$RLQ = \frac{\%\ resource\ in\ a\ given\ locale}{\%\ resource\ in\ a\ reference\ region}$$

As such, this metric provides a broad measure of recreational supply that captures wider spatial markets and provides a comparable measure of a region's recreational resources. Although it remains purely descriptive, it is useful in assessing where recreational resources are abundant relative to elsewhere.

A restatement of Equation 1 that bases the metric on population as a proxy for potential local recreational demand allows the RLQ to be calculated as follows (Equation 2):

$$RLQ_s^i = \frac{\left(\frac{r_s^i}{pop_s^t}\right)}{\left(\frac{r_n^i}{pop_n^t}\right)}$$

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 extent of the resource as follows (Equation 3):

$$RLQ_s^i = \frac{\left(\frac{r_s^i}{area_s^t}\right)}{\left(\frac{r_n^i}{area_n^t}\right)}$$

Application of recreation location quotient values infers the extent of local recreation supply as compared to the larger reference region. 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.

As a final extension and in an effort to account for proximate potential demand sources, we apply a straightforward modification of the RLQ that allows for travel distance and out-of-regional demand to be considered. Based on the literature related to effective recreation supply (Clawson, 1984; English & Cordell, 1993; Harrington, 1987) we apply a distance decay weight to the RLQ. The results are RLQ scores modified by the availability of the recreational resources and populations in adjacent regions.

Description of the Data

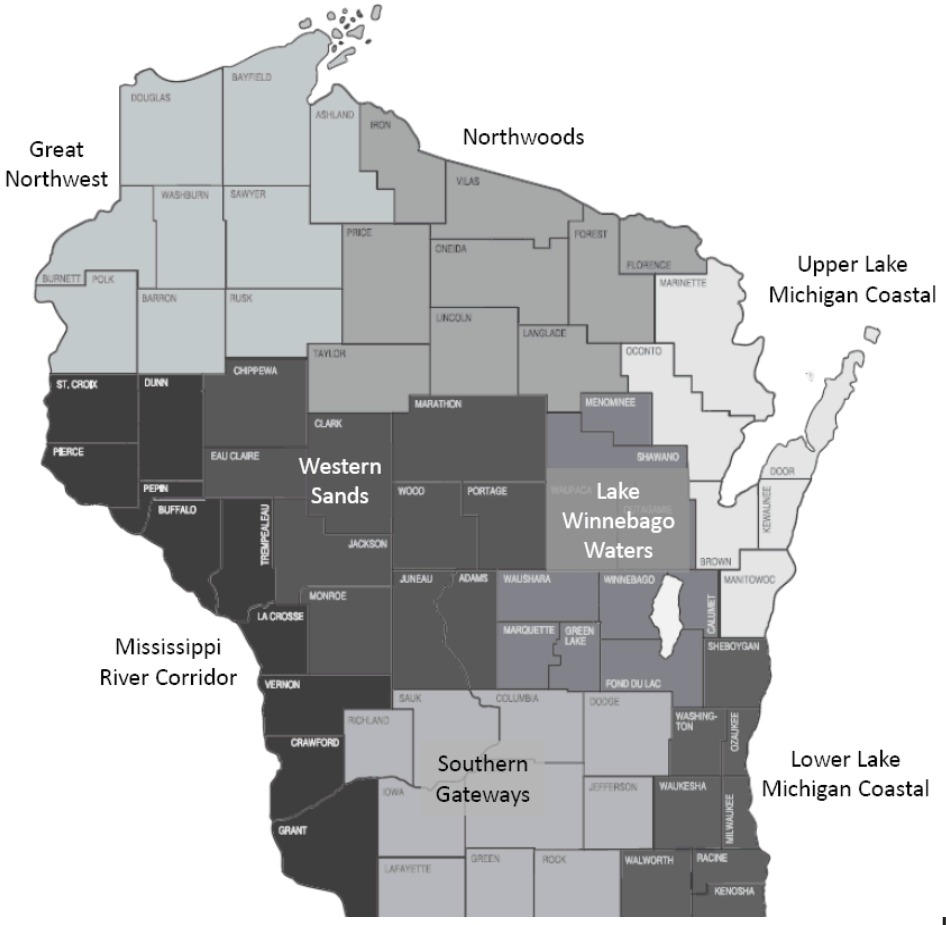
In our empirical demonstration, the supporting data used to calculate RLQs was developed at the county level for Wisconsin and has expanded on, yet remains consistent with, similar national datasets.[6] The dataset that we developed uses a set of 190 specific types of recreational resources, or elements, and a specification of basic ownership categories ranging from private (2 categories) to public (15 categories) as outlined in Table 1.[7] These recreational resources included specific recreational sites, private recreation-related firms, and the surrounding natural resource base (to capture regional natural amenity attributes).[8] This Wisconsin-specific inventory was developed 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.[9]

Useful applications of the non-aggregated RLQs suggest a host of highly detailed policy inferences. It is important to note, however, that at the disaggregated level, the incidence of null entries at the local level provides the possibility of biased results. Further, our needs in comprehensive recreation planning necessitated grouping the individual recreation resources into useful recreation typologies. The aggregation used in this demonstration was specific to our planning needs and could readily take on alternative forms based on the specification of alternative recreational typologies (c.f. Chubb & Chubb, 1981; Marcouiller, Kim, & Deller, 2004).

For interpretive purposes, these 190 recreation types were first standardized to their RLQ and then aggregated into a useful typology that served the purposes of current recreation planning processes (Wisconsin, 2006). It is important to note that the typology outlined in Table 1 was developed to match the demand categories obtained in related comprehensive planning work (outdoor recreation demand surveys). Again, the typology chosen can be readily adapted to alternative forms driven by the specific planning need.

Further, county-level data were aggregated into the eight respective planning regions as specified by the Wisconsin Department of Natural Resources. Again, regional delineations can take alternative forms based upon planning need. The regional delineations used in our empirical demonstration are found in Figure 1.

Figure 1. Regional Recreation Supply Regions Used in the Wisconsin SCORP (Wisconsin 2006)



Generally, recreation location quotients are sensitive to scale, extent of an element's presence, and reference region. Further note that the base metrics of our data vary widely. This necessitates the standardizing of recreational resources metrics to their RLQ, then averaging RLQs by both recreation type and regional aggregate.

Demonstration Results and Discussion

Regional recreation supply components by the 10 supply typologies as measured by population and area-based RLQ are displayed in Table 2. These results suggest some interesting locational issues that infer the extent of outdoor recreation opportunity provision. The most striking result suggests that regions with large local populations (locations of rel-

Table 1. Supply Data Elements and Their Placement within Broad Recreation Types Used in the Wisconsin SCORP (Wisconsin 2006).

Developed Land
- 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/second homes
- Shooting ranges—archery
- Skateboard parks
- Softball diamonds
- Tourist attractions and amusement places
- Trails—all types warm weather [miles]
- Zoos

Nature-Based Land
- Campgrounds—public and private [#}
- Campsites—non-electrical
- Caves—accessible
- Federal refuges [acres]
- Forest reserves [acreage]
- Forested land [acreage]
- Public hunting lands
- State natural areas [acres]
- State park [acres]
- Trust lands [acres]
- Waterfowl production areas [acreage]
- Wetland restoration areas [acreage]
- Wilderness areas [acreage]
- Wildlife areas [acreage]

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

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

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

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

Sports—Team
- 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
- ATV clubs
- Bicycling clubs
- Curling clubs
- Fishing clubs
- Golf clubs
- Horseback riding clubs
- Lawn bowling clubs
- Sailing and yacht clubs
- Ski clubs
- Snowmobile clubs
- Water ski clubs

Private Retail
- 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

Table 1. (cont.) Supply Data Elements and Their Placement within Broad Recreation Types Used in the Wisconsin SCORP (Wisconsin 2006).

Private Retail
- Circus companies
- Diver equipment and sales, retail
- Fishing bait and tackle dealers
- Golf equipment and supplies, retail
- Guide/charter services
- Guns and gunsmiths
- Horse riding and rentals
- Hotel/motel [beds]
- Hunting equipment and supplies, retail
- Motorcycle and motor scooter dealers
- Rafting tour agencies
- Recreational equipment/parts providers
- Saddlery and harness
- Skiing equipment—rental and retail
- Snowmobiles retail
- Soccer equipment and supplies, retail
- Sporting goods, retail
- Tennis equipment and supplies, retail
- Tourist rooming houses
- Tourist rooming houses [beds]
- Watersport equipment, sales and service
- Yacht charters

Sports Instruction
- 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

atively high potential local demand), in general, do not provide recreational opportunities in proportion to their population. 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 (0.56 and 0.93 respectively), indicating a relative lack of recreational resources relative to their populations (thought of as proxies for the extent of local demand). 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-based RLQs of 2.38 and 3.53 respectively).

In addition, an interesting aspect of these results suggests 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 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 types of recreation.

This is contrasted with the more rural parts of the state, where we typically find recreational resources embodied within surrounded natural resources such as forests, lakes, and river systems. Of particular interest are the RLQ results for the nature-based land and water-based typologies that include a host of elements reflective of the underlying natural resource base as it contributes to a regional natural amenity endowment. Clearly, the high RLQ for these two types are notable in the Northwoods and Great Northwest regions of Wisconsin, suggestive of the significant recreational landscape features present in regions noted for their forests, lakes, and rivers. These results are consistent with the notion that a region's natural resource base serves as a natural amenity endowment and acts to motivate visitation; the purpose of recreational sites thus serves the purpose of access to the surrounding and adjacent natural amenities.

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 that the population-driven RLQ rises. This reflects the simple fact that while

Table 2. RLQ by Supply Type for Wisconsin Recreation Planning Regions (source Wisconsin 2006)

	Recreation Typology	Great Northwest	North-woods	Upper L. Michigan Coastal	Lower L. Michigan Coastal	Southern Gateways	Miss. R. Corridor	Western Sands	Lake Winnebago
Population-Based RLQ	Developed Land	2.54	3.44	1.28	0.51	0.94	1.15	1.18	1.03
	Nature-based Land	3.52	7.01	0.56	0.17	1.02	1.61	1.05	1.06
	Water-based	4.71	6.50	1.65	0.27	0.59	0.78	1.05	0.86
	Snow and Ice	3.25	5.45	0.67	0.44	0.85	0.86	1.68	0.79
	Viewing and Learning	1.99	1.93	1.76	0.55	1.24	1.69	0.71	0.78
	Sports—Individual	1.84	2.35	1.09	0.53	0.99	1.54	1.50	1.05
	Sports—Team	0.71	0.94	2.61	0.87	0.87	0.83	0.70	0.97
	Private Clubs	2.25	2.83	1.23	0.81	0.73	0.95	1.12	0.84
	Private Retail	1.66	3.44	1.68	0.61	1.10	0.85	0.72	1.11
	Sports—Instruction	1.34	1.37	0.82	0.88	1.01	1.24	1.10	1.03
	Overall	**2.38**	**3.53**	**1.34**	**0.56**	**0.93**	**1.15**	**1.08**	**0.95**

Table 2. (cont.) RLQ by Supply Type for Wisconsin Recreation Planning Regions (source Wisconsin 2006)

	Recreation Typology	Great Northwest	North-woods	Upper L. Michigan Coastal	Lower L. Michigan Coastal	Southern Gateways	Miss. R. Corridor	Western Sands	Lake Winnebago
AREAL-Based RLQ	Developed Land	0.60	0.78	0.83	1.89	1.43	0.80	0.83	1.30
	Nature-based Land	0.83	1.59	0.36	0.61	1.56	1.12	0.75	1.34
	Water-based	1.11	1.47	1.07	1.00	0.90	0.54	0.74	1.09
	Snow and Ice	0.76	1.24	0.43	1.63	1.29	0.59	1.19	0.99
	Viewing and Learning	0.47	0.44	1.14	2.03	1.88	1.18	0.50	0.98
	Sports—Individual	0.43	0.53	0.70	1.95	1.50	1.07	1.06	1.32
	Sports—Team	0.17	0.21	1.69	3.22	1.32	0.58	0.50	1.23
	Private Clubs	0.53	0.64	0.80	3.00	1.11	0.66	0.79	1.06
	Private Retail	0.39	0.78	1.09	2.24	1.67	0.59	0.51	1.41
	Sports—Instruction	0.32	0.31	0.53	3.25	1.54	0.86	0.77	1.30
	Overall	**0.56**	**0.80**	**0.86**	**2.08**	**1.42**	**0.80**	**0.76**	**1.20**

Wisconsin has islands of urbanity, the state remains quite rural and is endowed with significant natural amenities even within regions characterized by relatively higher populations. With respect to the link between natural amenity endowments and recreation, results suggest that relatively high Areal RLQs for the nature-based land type occur in the Southern Gateways and Lake Winnebago regions (regions with relatively higher population densities), reflecting the extent of these elements.[10] 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 such as organized sports, retail/service opportunities, and viewing and learning resources.

It is also possible to transform the RLQ to take account for interregional demand and supply characteristics. Adopting the method forwarded by English and Cordell (1993) we weighted each RLQ by a distance decay measure. The results of these calculations for the two land-based recreation typologies are presented in Table 3. The distance decay RLQ becomes more balanced between regions as one accounts for interregional travel. As the assumed maximum travel distance becomes longer, the relative disparity between regions decreases.[11] Northern regions of Wisconsin and the Northwoods no longer show such an abundance of supply as we begin to account for travel to these regions from other regions of Wisconsin. The central region of Wisconsin, Western Sands, has the shortest aggregate travel distance to all other regions of Wisconsin and as a result the rise in weighted RLQ is larger for this region.

The primary effect of weighting the RLQ by a distance-decay measure is that it accounts for the fact that people will incorporate travel distance into recreation location decisions. It has the effect of dampening RLQ scores; in effect lessening regional disparities as we account for travel to recreation sites and areas between regions. The result is that an RLQ score of 1.0 can no longer be so neatly compared to the reference region. Moreover, populations of recreationists do not divide so neatly by regional or county boundaries. For example, many parts of Wisconsin have large seasonal resident populations. This raises the question of distinguishing (through weighting) between alternative types of regional populations, or different demand sources. Most clearly, the arbitrary nature of state and national borders will also tend to influence relative scores. Moreover, the same factors that are a limitation of the recreation location quotient itself are also a limitation of devising reasonable distance decay measures. Namely, demand for different recreation activities will be influenced by variations in regional tastes and preferences, 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. In addition, once a dataset has been development, flexibility exists to allow the planning analyst to specify alternative recreational resource typologies and alternative regional frameworks.

Summary and Further Research Needs

Local recreational resources exist as a complex combination of natural amenities, publicly provided recreational sites, and supporting private activities that are influenced by an array of factors. Objective assessments of regional recreational resource supply are an integral part of comprehensive recreation planning with a variety of analytical approaches regularly employed. To be effective, recreation resource supply data and its corresponding analysis require the ability to capture a variety of physical and environmental attributes that make up the local recreation resource. Further, effective analytical technique of local recreation resource supply data accounts for spatial uniqueness of the local region; namely, it relies on standardization by some useful proxy for potential local demand and allows regional comparisons to be made in a flexible manner.

Table 3. Population-based RLQ Modified by Distance Decay Meaures.

	Recreation Typology	Great Northwest	North-woods	Upper L. Michigan Coastal	Lower L. Michigan Coastal	Southern Gateways	Miss. R. Corridor	Western Sands	Lake Winnebago
Population-Based RLQ	Developed Land	2.54	3.44	1.28	0.51	0.94	1.15	1.18	1.03
	Nature-based Land	3.52	7.01	0.56	0.17	1.02	1.61	1.05	1.06
RLQ with distance decay of 120 miles maximum travel distance	Developed Land	1.82	3.09	1.39	0.62	1.31	1.16	1.63	1.19
	Nature-based Land	2.41	5.94	1.03	0.36	1.53	1.58	2.06	1.26
RLQ with distance decay of 280 miles[12] maximum travel distance	Developed Land	1.57	2.56	1.56	1.15	1.31	1.23	1.58	1.23
	Nature-based Land	2.09	4.38	1.53	1.27	1.55	1.46	2.24	1.29

[12] This distance is slightly more than the longest straight-line distance between region centroids.

In the applied planning research reported in this paper, we develop a comparative regional recreation resource assessment technique and demonstrate its usefulness at the sub-state regional level in Wisconsin. This is done to illustrate the usefulness of a recreation location quotient (RLQ) as an effective assessment approach to understanding relative outdoor recreation supply. Supporting data included 190 county-level elements that characterized outdoor recreation resources in Wisconsin during 2004. Our demonstration suggests that the RLQ has the ability to produce results that are regionally comparative, standardized to useful base metrics, easily interpretable, and flexible to alternative regional specifications and recreation typologies.

Our empirical results suggest some interesting generalizations that can be made based on the extent and type of locally available recreation resource throughout the state. First, the extent of outdoor recreation opportunities varies widely throughout Wisconsin. Sub-state regions with large local populations (locations of relatively high potential local demand), in general, do not provide outdoor recreational opportunities in proportion to their population. Second, wide variation exists in the type of outdoor recreation provided throughout the state and results suggest that recreation type is strongly influenced by key spatially distinct differences in population. In other words, the specific type of recreational opportunity present is largely a function of a local region's level of urbanization.

There is certainly ample opportunity for further refinements of the RLQ approach to recreation supply assessment. Adaptations of the RLQ could standardize the extent of local recreational resources on alternative local metrics that better relate to unique attributes of local recreation demand. For example, with specific data on retirement migration, regions that attract older people can utilize an adapted RLQ with age-specific recreational demand information to develop age-appropriate recreational opportunities. Demographic characteristics help define demands for a particular activity and can be used to provide refinements that improve on resident population to standardize the RLQ. Similarly, other factors such as income and education, which have been shown to be determinants of recreation preference, could be used to standardize the RLQ.

While providing a useful demonstration of the technique, we must also clearly point to limitations of the RLQ. First, the RLQ remains a technique to allow assessment of the comparative regional presence of recreation resources and is not an appropriate technique to assess recreational demands. Our reference to the RLQ being standardized to the size of local populations does not infer useful information specific to local recreation demands (e.g., variations in local preferences, demographic structure, etc.). Second, the equilibration of outdoor recreation supply with demand for recreational resources is likewise not able to be inferred from our analysis. Realistically, this key need remains mired in the analysis of jointly produced natural resources endowments, constraints on limited public funds to invest in outdoor recreation, changing preferences of the outdoor recreationist, stakeholder involvement, and feasibility assessments of market demand. Analytically, alternative techniques are better suited to assess the equilibrium between supply and demand of outdoor recreation.

Our demonstration reinforces the complexity of regional assessments of outdoor recreation resources but returns to the continued importance of objective regional analysis. We live in a land of diverse and dynamic outdoor recreation opportunities. Meeting the needs of an equally diverse and ever-changing array of outdoor recreation demands requires continual effort to refine and apply creative planning tools with the objective of providing decision-makers the means to make wise choices in the allocation of scarce public funds for future investments in outdoor recreation.

Footnotes

[1]Indeed, the notion that consumers are integrated into the production process, while central to the experience industry concept of tourism (Pine & Gilmore, 1999), appears generally inimical to production oriented micro-economic analysis where consumers demand (consume) by maximizing utility subject to a budget constraint and firms supply (produce) by maximizing profit subject to a cost structure. With the exception of tourism, the two dare never become confused. An interesting ongoing debate regarding the experience industry paradigm in parks and recreation is available for the interested reader in a recent issue of this journal (c.f. Ellis & Rossman, 2008; Rossman & Ellis, 2008: Sylvester, 2008).

[2]This is not a new argument. Clawson & Knetsch (1966) recognized that additional components of recreation supply were obvious, but given the immediacy and importance of comparative recreation supply metrics concluded that descriptive measures of areal quantity or trail mileage serve as a first approximation of recreation supply.

[3]While extending previous research, the work reported in this article is unique and applies a comprehensive dataset on recreation resources while incorporating distance decay metrics thus furthering a spatial approach to incorporating primary demand markets within a supply framework.

[4]Supply techniques forwarded to account for this form of recreational demand (such as the Effective Acre Equivalent, or EAE, and the Effective Recreation Opportunity Set, or EROS, method) are limited by data availability, general lack of an ability to distinguish qualitative elements of recreational sites, and/or a general inability to reflect useful comparative metrics.

[5]This adaptation specifies a reference that extends from the local region using specified geographic distance known as distance decay.

[6]For instance, the National Outdoor Recreation Supply Information System (NORSIS) developed by the USDA Forest Service provides some analogous data elements to our dataset but does not include data for a host of locally available recreation sites.

[7]In Table 1 and the subsequent analysis reported here, ownership is aggregated. Indeed, ownership is another key site characteristic that relates to the recreation planning process. While not the focus of the analysis reported here, it is important to note that our dataset is comprehensive and allows future supply assessments with respect to this key site characteristic.

[8]With respect to regional natural resource endowments, it is important to note that these are primarily captured in our nature-based land and water-based groupings (see Table 1).

[9]Dataset is available upon request. 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.

[10]Our intimate knowledge of these regions confirms these findings, which reflect underlying local natural resources presented by significant landscape features such as the Baraboo Bluffs and the Horicon Marsh respectively. These two examples account for surprisingly extensive (large areal coverage) recreational resources.

[11]The approach has the effect of muting the spatial variability of natural resources and differentiation by resource type.

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