

ESTIMATING DISPERSED RECREATIONAL USE ON MICHIGAN'S STATE AND NATIONAL FORESTS

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A study to estimate dispersed recreational use on three Michigan public forests was conducted April-December 1992. Use was estimated to be 9.3 hours per acre over the period. Travelers to the forests accounted for 45% of the use and inholders within the forests who did not drive a car or truck onto the public lands accounted for 55%. Hunting, offroad vehicle use and hiking/walking were the most frequently cited principle dispersed activities.

Introduction

The state of Michigan has 6.5 million acres of public forests. There are 6 state forests totaling 3.9 million acres and four national forests with 2.7 million acres (Wells and Eidelson, 1991). Much of this public acreage remains undeveloped and open for dispersed recreation, recreation occurring without the benefit of facilities developed specifically for an activity, such as designated trails, campgrounds, etc. Examples of dispersed activities include fishing, camping, hunting, nature observation, picking berries, and ORV riding done without benefit of a human made facility.

In January of 1992, the Department of Park and Recreation Resources of Michigan State University (MSU) entered into a Cooperative Agreement with the USDA Forest Service (USFS) and into a contract with the Michigan Department of Natural Resources (DNR) Forest Management Division to estimate dispersed recreational use on the 950,000 acre Huron-Manistee National Forests and the 760,000 acre AuSable State Forest. These forests comprise approximately 1.7 million acres of public lands within dedicated boundaries of 3.4 million acres and are located in North Central Lower Michigan.

The project had a number of unique features. First was that state and national forest managers cooperated so their lands were sampled with the same instrument and procedures. The rationale for this cooperation is many fold:

1. Both ownerships are poorly signed, thus recreationists may not be certain on which lands they are recreating;
2. Their properties often adjoin, thus recreationists cross property lines during a single activity;
3. Both agencies are involved in managing for and regulating similar activities with recent cooperative efforts including promulgation of similar land use rules for off-road vehicles (ORV).

Second, the measurement of dispersed use differs markedly from the typical estimates of recreation at developed facilities. For example, at developed campgrounds, campers are congregated at known locations and mandatory registration and fees provide

reasonably accurate estimates of use. Similar situations exist at trail heads, designated boating access sites, scenic overlooks and picnic grounds, interpretive centers, etc. where vehicle counters can readily be used to estimate visitation when combined with visual observations. Dispersed recreation is different. Recreationists are unlikely to be concentrated and shift locations throughout the year based on activity type. Further, one recreationist may range over a number of square miles in the course of one activity. Finally, registration may not be mandatory or voluntary and access and egress may be essentially unlimited and not under control of the land managing agency or agencies.

Third, few examples in the literature are available concerning methodology for measurement of dispersed use in a forest-wide setting especially with unlimited access, no registration and significant private in holdings. For example, James and Henley (1968) suggest cordon sampling, but it is not feasible with numerous access roads not controlled by the forest managers. Ryel et al. (1982) and Hussain et al. (1987) reported estimates of dispersed use in the Pigeon River Country State Forest in Northern Lower Michigan. Their methodology was similar to that recommended by McCurdy (1970). It was to count parked vehicles within large sample areas. Then a postcard questionnaire was left with the vehicle to determine the recreational activities of the occupants while parked, the number of people in the vehicle and the length of time the vehicle was parked within the sample area. Data was then extrapolated to estimate total dispersed use. Estimates of dispersed use over a 12 month period in the 100,000 acre forest were that use was approximately 3.5 hours per acre per year. The most common principal activities of respondents were: fishing, hunting, mushroom/berry picking and hiking/ walking. The period April through December accounted for 96% of dispersed recreational use of the Forest.

The Pigeon River Country State Forest area however, differed significantly from the Huron-Manistee and the AuSable Forests. The acreage of the Huron-Manistee and AuSable Forests was 17 times the size of the Pigeon River Forest. Second, approximately 50% of the land within the dedicated boundaries of the Huron-Manistee and AuSable Forests is private versus less than 5% in the Pigeon River Forest.

Hence, the basic methodology applied at Pigeon River was appropriate for recreationists who travel to the site with a reduction in the proportion of the forest sampled due to the immense acreage. An additional methodology was necessary for adjacent inholders. These landowners and their guests were readily able to ski, walk, ride a bicycle, horse, snowmobile or ORV across their property line to the public land without the use of a car or truck.

The objectives of this study of dispersed recreation on the Huron-Manistee National Forests and the AuSable State Forest were to:

1. Estimate dispersed recreational use hours and key dispersed activities for each forest.
2. Determine the management implications of this use.
3. Explore improvements in methodology for estimating use on large acreage with limited financial and personnel resources.

Methods

To meet the objective of estimating dispersed use on a forest-wide basis, and taking into account substantial differences between various parts of the forests, sample areas were chosen on a stratified, random basis across the 1.7 million acre public area. Strata selected were the 7 Ranger Districts in the Huron-Manistee and the 3 Forest Areas in the AuSable. Within these strata, the most convenient division of lands that would allow random selection of a set of sample of areas from each strata were forest compartments. On the AuSable, these compartments averaged about 1,750 acres in size, while on the Huron-Manistee they were considerably smaller, averaging approximately 800 acres per compartment.

Compartments were randomly selected within each forest area to sample 5-6% in each strata. For the Huron-Manistee, compartments were paired to provide a comparable size to the AuSable compartments. The total area sampled was 5.1% in the AuSable (39,050 acres) and 5.8% in the Huron-Manistee (55,100 acres).

To sample tourists (those who drive to the forest and park), once compartments had been selected they were grouped into clusters for ease of travel by researchers. Clusters typically contained 6 sample compartments. Travel distance among the compartments within a cluster were typically 80 miles. In addition, researchers might have to travel up to 75 miles one way to reach the cluster from their home base centrally located within the forests.

Ten sample days for each cluster were selected for each season (spring April-June; summer July-September; fall October-December) for a total of 30 sample days. Based on the even division between weekend and weekday use for monitored Northern Lower Michigan State Parks, 5 weekend and 5 weekday sample days were systematically chosen with a random start for each season. Based on the Pigeon River data which showed very low dispersed use levels during the winter (Hussain et al. 1987), coupled with the likelihood of unplowed roads and budget constraints, the authors and the agencies mutually decided not to sample during January - March.

On a cluster's sample day, a researcher driving a two wheel drive vehicle would visit each compartment in the cluster. No developed recreational sites (should there be any within the cluster) would be sampled. At all other locations, all vehicles visible from roads, parked within or adjacent to the each sample compartment on public lands or road rights of way, would be sampled by counting the vehicle, recording the date on a vehicle log for each compartment and placing a business reply postcard questionnaire on the windshield of the vehicle. If the occupants of the vehicle were present, the card would be handed to them and if they were ready to leave, the researcher would encourage them to complete the questionnaire at that time and would receive it when they had done so. Researchers typically spent 1 hour in each compartment with 20 minutes drive time between compartments. Sampling was done between 8 AM and 6 PM. Researchers varied their routes through the clusters to maximize the number of different times of day they sampled any given compartment. Two researchers worked 5 days per week for 9 months on the field portion of this project. Once post cards were returned to the authors, the data was entered for analysis using SPSS PC.

Data were weighted to account for length of stay bias. Length of stay bias occurs when parties recreate on a site for differential lengths of time. For example, one party may be there 1 hour, while another may be parked for 48 hours. This provides a much greater chance of sampling those staying 48 hours than those staying 1 hour. The weighting procedure followed was to weight cases by the reciprocal of the number of hours the car was parked at the site where sampled (e.g. for example 1/1 for 1 hour and 1/48 for 48 hours).

Landowners within the sample compartments were identified by county plat book and their address located through the office of the county assessor. A mail questionnaire with postage paid return envelope was sent to a systematically selected sample of 50% of these landowners from each forest. It asked about the dispersed recreation use of the adjacent public lands April-December 1992 when the landowner, members of their household and guests didn't park a car or truck on the public lands or on a public right of way. The number of landowners identified in this manner is likely to be conservative as parcels less than 5 acres in size are unlikely to be separately listed in plat books. Hence, the dispersed use landowners make of the public forest is likely to be somewhat greater than that identified by this methodology. Two mailings of the landowner questionnaire were done, the first in March 1993 and a second, certified mailing in April 1993.

Results and Discussion

April-December 1992, 1,531 vehicles were counted and sampled in the compartments. Of those, 826 (54%) of the drivers responded. For the mail questionnaire, of the 679 landowners sampled 45 had invalid addresses identified by the US Postal Service. Of the 634 with valid addresses, 460 (73%) responded.

Dispersed Use Estimation

Dispersed recreational use hours of tourist recreationists for each forest were estimated on a seasonal basis by multiplying:

1. the mean number of people per vehicle,
2. the mean hours of stay per vehicle,
3. a factor that extrapolates the size of the sample areas to the size of the entire forest,
4. a factor that extrapolates the 10 sample days in each season to the number of days in a season (spring, summer, fall), and
5. a factor that extrapolates the mean hours of stay per vehicle in each season to the average hours of daylight per day in each season. (This was done as sampling was only carried out for 1 hour on a sample day in a given compartment. Thus a person there for 5 hours in a day with 15 hours of daylight had only a 1 in 3 chance of being sampled, even on a sample day.)

Adjacent landowners computed their dispersed use hours and those of their households and guests over the April-December period for the nearby public forest. The mean was then extrapolated by a factor that included all named ownerships in the sample compartments. This was then multiplied by a factor that extrapolated those results to the entire forest.

Table 1 (next page) shows the aggregated dispersed use estimate for the forests during April-December 1992. Approximately 45% of the estimated use was by tourist recreationists and 55% by adjacent inholders and their households and guests. Use levels were below one 12-hour recreational visitor day per acre. This level of use offers substantial opportunities for solitude.

Dispersed Activity Implications

The main activity reason for tourist dispersed recreationists being found in the sample forests is shown in Table 2.

Hunting was the most frequently cited main reason for visiting the forest. Species that were legal to hunt during the sampling period included wild turkey (spring, fall) ruffed grouse/woodcock (late summer, fall) and white-tailed deer (fall). However, activities related to deer hunting such as blind building, baiting and scouting were legal throughout the sampling period, and many reported they were involved in these deer hunting activities in September (late summer) prior to the October 1 (fall) opening of archery deer season.

ORV riding was much more likely to be cited in the AuSable State Forest rather than the Huron-Manistee National Forests. Both forests have identical ORV regulations (all areas closed unless posted open) and no designated ORV riding areas or trails were sampled. However, law enforcement on the state forests is limited to conservation officers, who are also responsible for fish, wildlife and environmental law enforcement on public and private lands. Their staffing level is approximately 1 officer per 175,000 acres of public and private land. Conversely, U.S. Forest Service Special Agents and Level II officers can both enforce National Forest ORV regulations and issue citations. Their staffing levels greatly exceed those of conservation officers and their duties are confined only to national forest lands. Also, the Forest Service had closely cooperated with the Cycle Conservation Club, a state-wide ORV group, to organize volunteer safety patrols on the Huron-Manistee to provide peer pressure to keep riders on designated trails and in designated areas.

Table 1. Estimate of dispersed recreation hours during April-December 1992 for tourists and adjacent landowners on the Huron-Manistee National and the AuSable State Forests.

Forest/Visitor Type	Recreation visitor hours (thousands)	12-hour recreation visitor days (thousands)	Recreation hours/acre
Huron-Manistee			
Tourist	3,564.3	297.0	3.8
Adjacent landowner	4,369.0	364.1	4.6
Total	7,933.3	661.1	8.4
AuSable			
Tourist	3,653.5	304.5	4.7
Adjacent landowner	4,587.7	382.3	6.0
Total	8,241.2	686.8	10.7
Combined			
Tourist	7,217.8	601.5	4.2
Adjacent landowners	8,956.7	746.4	5.2
Total	16,174.5	1,347.9	9.3

Table 2. Percentage of tourist dispersed recreationists citing activity as main reason for visit to the Huron-Manistee National or AuSable State Forests during April-December 1992.

Activity	%		
	Huron-Manistee	AuSable	Combined
Deer hunting	44.8	34.4	39.8
ORV riding	1.8	25.4	12.1
Grouse/woodcock hunting	6.2	11.7	8.7
Fishing	7.8	4.0	6.2
Nature observation	4.3	7.7	5.8
Hiking/walking	5.2	2.2	3.9
Picking berries/mushrooms	6.1	0.6	3.7
Other hunting	5.2	0.6	3.1
Canoeing	2.2	2.0	2.1
Turkey hunting	2.3	1.1	1.8
Swimming	0.0	2.9	1.3
Horseback riding	1.4	0.2	0.9
Camping	1.0	0.4	0.7
Backpacking	0.2	0.0	0.3
Other activities	11.6	7.2	9.6
Total (a)	100.1	100.2	100.0

(a) Total may not add to 100.0% due to rounding.

When landowners were asked to identify the most important dispersed use they, their household and guests made of the adjacent public forest without driving a car or truck onto the

public lands or a public right of way, they most often cited deer hunting (Table 3).

Table 3. Percentage of adjacent landowners citing activity as most important dispersed recreation on nearby Huron-Manistee National or AuSable State Forests during April-December 1992.

Activity	%		
	Huron-Manistee	AuSable	Combined
Deer hunting	44.2	43.5	43.8
Hiking/walking	26.8	27.9	27.2
Nature observation	7.9	5.2	6.7
ORV riding	4.2	7.1	5.5
Snowmobiling	2.6	5.2	3.8
Fishing	5.3	1.3	3.5
Picking berries/mushrooms	2.1	3.9	2.9
Grouse/woodcock hunting	1.1	2.6	2.0
Horseback riding	1.6	1.3	1.4
Turkey hunting	0.5	1.3	0.9
Swimming	1.1	0.0	0.6
Camping	0.5	0.0	0.3
Other hunting	0.5	0.0	0.3
Other activity	1.6	0.6	1.2
Total	100.0	99.9	100.1

(a) Total may not add to 100.0% due to rounding.

An activity that was cited much more as the most important use by landowners than tourists cited as their main reason for visiting the forest was hiking/walking. ORV use was less likely to be cited by landowners than by tourists to the AuSable State Forest.

The ever more numerous gateways to the public forests as a result of fragmentation of inholdings and the development of vacant land have resulted not only in landowner households accessing public lands but also guests. When asked how many people were in their household, landowners on the AuSable had a mean response of 2.6 and on the Huron-Manistee 2.5. However, when asked how many members of their household and guests accessed the public lands without a car or truck from their inholding to participate in the most important activity, a mean of 6.0 people did on the AuSable and 6.2 on the Huron-Manistee.

Of the landowner respondents, 71.3% in the AuSable and 68.7% in the Huron-Manistee had first or second homes on their inholding. This concentration of homes can encourage access to the forest on a year-round basis and provide support facilities for household members and guests on the doorstep of the public lands regardless of holidays or the weather.

Methodology Refinement

Two major refinements to methodology are suggested as a result of this study. Both are designed to increase efficiency while not detracting from the randomness of sample site selection.

First, instead of randomly selecting single 1,750 acre compartments within a ranger district or forest area, compartments should be paired or grouped in threes. This allows the random selection of one compartment group or pair to account for a larger amount of forest area. This results in fewer compartment pairs or groups that need to be selected and cuts drive time between compartments. During 1993-1994 in Michigan's Upper Peninsula, this strategy was used in a dispersed recreation study to select sample compartments on the Hiawatha National and the Lake Superior State Forests. It resulted in an ability to sample 10% of the forest area versus 5% in the Huron-Manistee/AuSable study with a decrease in drive time between compartments.

Second, profitable use of the drive time between sample compartments is possible. In the current Upper Peninsula study, unstaffed parking areas at developed day use facilities on the travel route are being sampled. The same postcard questionnaire that is used with dispersed tourist recreationists is used and baseline data is being gathered about use of these sites. This is done by simply coding the site location in a manner that allows differentiation between developed and dispersed sites. Developed day sites include motorized and non-motorized trail heads, boat launches, picnic areas and historic markers. Approximately 1/3 of these developed, unstaffed day use facilities within the two forests are being sampled.

Conclusions

Cordell et al. (1990) suggests that the demand for many dispersed recreational activities is likely to increase over the next 50 years. Unfortunately little research attention, especially longitudinal research, has been devoted to the amount and type of dispersed use on the public forests outside of wilderness and primitive areas. Since less than 1% of the forest land in the Huron-Manistee National Forests and the AuSable State Forests is designated wilderness and none of these areas were sampled in this study, dispersed use in the working/multiple use portions of these public forests appears to be substantial. It is vital that this use be understood and considered in the planning and management of public forests. The methodology presented provides a cost effective way to estimate dispersed use and could be adapted to most forest areas.

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