STATE GAME AND WILDLIFE AREA RECREATION USE ASSESSMENT: MICHIGAN'S MAPLE RIVER STATE GAME AREA, FALL 2005

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Abstract.—Michigan state game and wildlife areas (SGA) provide the most public land in southern Michigan, where 8.5 million people reside. These areas are managed for wildlife habitat and wildlife associated recreation. They charge no entry fee, have many access points, and have little or no on-site staff. Recreational use on SGAs has not been assessed since the 1970s. This paper reports on a use assessment on the 8,000-acre Maple River SGA during fall 2005. It follows past methods of assessing on-site use by counting parked vehicles and leaving a business reply mail postcard with the vehicle. It also uses a mail questionnaire to all adjacent private ownerships to determine game area use not involving vehicles parked on public land/roads. Results show the game area had 52,000 person-use hours from September 15 - December 15, 2005. Of those, 76 percent were by on-site users parking vehicles on the game area or adjacent public roadways and 24 percent were by adjacent owner households and their guests parking outside of the game area. Hunting was the most common recreational activity. On-site users were generally satisfied with their experience. Key sources of satisfaction included exceeding expectations of seeing wildlife, quality habitat, and a place to hunt. Sources of dissatisfaction included vandalism, litter, conflicts with others, and not seeing expected wildlife. Adjacent landowners were less satisfied with their interactions with game area users and managers. Key sources of dissatisfaction included trespassing, vandalism, and litter by users and lack of responsiveness to concerns by managers. Recommendations to improve the situation include additional policing, emphasizing stewardship and ethics in hunter safety training, establishing a game area watch program, and regular, well publicized citizen clean-ups of the SGA.

1.0 INTRODUCTION

Michigan has 100 state game and wildlife areas (SGA) encompassing approximately 340,000 acres. They are primarily located in southern Lower Michigan, where 85 percent of the state's 10 million residents live, and provide the region's largest acreage of public land open to outdoor recreation. They are generally undeveloped lands managed for wildlife habitat and wildlife oriented recreation. SGA acquisition and management is funded provided a user pay system of hunting licenses and federal excise taxes on sporting arms and ammunition (Pittman-Robertson). Understanding the recreational use and management challenges and solutions regarding these wildland-urban interface public lands is important to managers of generally undeveloped public lands near population centers.

The last study of recreational use of Michigan game and wildlife areas was done in the 1970s (Belyea & Lerg 1976). Since that time the range of non-wildlife oriented outdoor recreation activities has expanded to include mountain biking and geocaching. Wildlife oriented recreation opportunities in southern Michigan have also expanded to include wild turkey hunting, resulting from successes in reintroducing wild turkey to their former Michigan range. Also included are wildlife viewing for recovering and expanding populations of bald eagles and other raptors as well as documented significant interest in wildlife viewing by a broad spectrum of the population (US Fish and Wildlife Service 2002). In addition, previous studies of game area recreation use did not sample adjacent residents concerning the use of game area by their household and guests when they did not park on the game area (Gordineir 1957, Palmer 1967, Belyea & Lerg 1976).

To update information on recreational use of Michigan state game and wildlife areas accounting for new uses

and the activities of adjacent households, the Michigan Department of Natural Resources (DNR) contracted with Michigan State University's Department of Community, Agriculture, Recreation and Resource Studies to pilot improved methodology and assess game area use on 11 of Michigan's game areas in 2006. This paper reports on the fall 2005 (September 15 - December 15) pilot study at the Maple River SGA. The area has approximately 8,000 acres of publicly owned land in central Lower Michigan along approximately 20 miles of the Maple River in Gratiot, Clinton and Ionia counties. It is primarily composed of river floodplain and is a mixture of lowland hardwoods, open marsh, lowland grasslands, and agricultural fields managed to provide habitat for wildlife (game and non-game) and opportunities for wildlife oriented recreation. Facilities available include designated parking areas, wetlands with water management capabilities, a wildlife viewing platform overlooking two major wetlands, boat launches to wetlands and the Maple River (including some with concrete ramps for trailered boats), and access via county and game area roads. There are no designated trails, no developed campgrounds and no permanent restrooms.

1.1 Objectives

One of the objectives of the research was to serve as a pilot for the methodology to assess recreational use at selected Michigan state game and wildlife areas during 2006-2007. The second objective was to provide use and user information about the Maple River SGA to assist in developing its management plan. Third, the research would provide data to the Michigan Department of Transportation about recreational use as the department plans the upgrade of US127, a highway bisecting the game area.

2.0 METHODS

On-site use was estimated in a two step-process. The first step was to systematically count vehicles at all points accessible to a two-wheel drive car in the game area and public road shoulders adjacent to the game area. These counts were conducted on 23 selected days between September 15 and December 15, 2005, either during the morning, midday, or afternoon. Of the 23 days, 10 were weekend days (Saturday or Sunday), holidays (Thanksgiving and Friday after Thanksgiving) or opening days of a hunting season. As a group, they were characterized as "high-use" days. The 11 sample days were 33.3 percent of the 33 high-use days. A twelfth high-use sample day (weekend day) was lost due to deep snow and unplowed roads on December 10. The other 12 were on weekdays (Monday - Friday) that were not opening days of a hunting season or holidays. They were characterized as "low-use days." The 12 sample days were 20.3 percent of the 59 low-use days.

After each vehicle was counted and its GPS location noted, a business reply postcard questionnaire was placed on the windshield of each vehicle or given to the driver if he/she was present. In the case of inclement weather, the card was placed inside a clear plastic lab bag so it was not damaged by the weather. The card elicited information about the number of people in the vehicle, the primary and secondary activities in which they engaged while parked at the game area, their opinions about their experience that day, and background demographic and outdoor recreation participation information. Overall recreational use by those who parked on-site was estimated by extrapolating the mean number of people hours per vehicle across the sample period.

The questionnaire also elicited information about distinct users. To effectively report this information, the data must be weighted to account for frequency-of-use bias. For example, a game area visitor who visits the area 20 times during the sample period compared to one who visits only once has a 20 times greater chance to be sampled than the one-time visitor. Hence, to describe distinct users, the data is weighted by the reciprocal of the number of times a visitor came to the area during the previous 12 months.

Use by the households of adjacent properties and their guests when they did not park on the game area or on a public road right of way adjacent to the game area is important and was not estimated in previous SGA use assessments. In past studies of public land use, neighbors and their guests can be responsible for half or more of public land use without parking vehicles on public lands (Nelson & Lynch 1994, Nelson et al. 1994, Nelson & Lynch 1995). This adjacent landowner generated use was estimated using a mail survey. All private parcels

in direct contact with the game area were defined as adjacent and were identified by examination of county assessor records of the three counties (Clinton, Gratiot, and Ionia) in which the game area lies. Based on county assessor records, a total of 221 different households fit the definition of adjacent landowners. The mail questionnaire was sent to the property owners on December 15, 2005 at the conclusion of the study period, and the owners were asked to recall use emanating from their property as well as provide additional information about their interactions with game area users and managers and background demographic information. Those who did not respond to the first mailing received a reminder postcard two weeks after the initial mailing. If they had not responded in another two weeks, a second copy of the survey, a revised cover, letter and another business reply envelope were sent.

3.0 RESULTS

On-site results are presented by estimated use, characteristics of estimated uses, and distinct user characteristics. Estimated use is derived from vehicle counts and the number of people and the length of stay reported on questionnaires completed by drivers. Characteristics of estimated uses are drawn from un-weighted analysis of questionnaires (one questionnaire equals the characteristics of a use), and distinct user characteristics are drawn from completed questionnaires weighted to compensate for frequency-of-use bias.

Adjacent landowner use is not weighted as it is a census of all adjacent owners and was not sensitive to an adjacent resident's being a frequent, infrequent, or non-user of the game area. Of the 221 identified adjacent landowner households, 12 had bad addresses and were removed from the sample. Of the remaining 209 households, 130 (62%) responded.

3.1 On-Site Use Estimate

A total of 621 vehicles were counted on or adjacent to the game area during the 23 sample days in the period September 15 - December 15 in assessing on-site use. A total of 91 percent were parked in designated parking areas. A vehicle was counted when it was distinct for that sample day (had not been previously counted that sample day on the game area). Of those, 441 (71.0%) were on high-use days and 180 (29.0%) were on low-use days. Extrapolated for the full number of high-use days (33/11=3.0), the total vehicle estimate for high use days is 441 x 3.0=1,323. However, since vehicles were counted only once at each location on the game area, it is necessary to assess the possibility that on a sample day a vehicle would be counted. The mean number of hours respondents reported their vehicle was parked on the game area was 5.9. This is equal to approximately half the daylight hours of any given sample day. Hence, the possibility of sampling the mean vehicle present during some portion of a sample day is approximately one in two. Accordingly the number of vehicles estimated is doubled to 2,646 for high-use days.

Following a similar procedure for the full number of low-use days (59/12=4.92), the total vehicle estimate for low use days is 180 x 4.92=886. Multiplied by two to account for the influence of length of stay on being counted provides a total low-use day vehicle estimate of 886 x 2=1,772. For the September 15 - December 15 season, the total vehicle use estimate is 4,418, with 60 percent on high-use days and 40 percent on low-use days. Based on responses to the questionnaire, the mean vehicle had 1.52 persons. This extrapolates to 6,715 person uses by people who parked on the game area or adjacent to it on a public right of way during fall 2005.

3.2 Person Use Hours

Person use hour information was gathered through the postcard questionnaire left on the windshield of each vehicle sampled. Of the 621 questionnaires distributed to the drivers of parked vehicles, 182 (29.3%) were completed and returned by the cutoff date of December 27, 2005. Of those 182, 12 completed two questionnaires (were surveyed two different days and responded as requested both times). Person use hours are computed by multiplying the number of vehicles estimated by the mean person use hours per vehicle. Mean person use hours per vehicle are estimated by the mean number of hours a vehicle is parked multiplied by the mean number of people in the vehicle.

The mean number of person use hours per vehicle was 9.01 with a standard error of the mean of 0.63 hours. Two standard errors of the mean is 1.26 hours or ±14.0

percent at the 95 percent confidence interval. The maximum number of person use hours an individual could account for in one day was truncated at 15 hours. This is analogous to a person arriving at 5 AM to reach his/her deer stand, hunting all day, and returning to his/her vehicle after dark at 8 PM. Multiplying 9.01 person hours by the 4,418 estimated vehicles provides a person use hours estimate of 39,806 hours, plus or minus 5,573 hours (14%).

Adjacent-owner respondents reported that 73 percent of the households and their guests used the game area one or more times during fall 2005 without parking a vehicle on the area or on an adjacent public roadway. Across all respondent adjacent ownerships, the mean household and its guests used the area for 59.1 person hours during fall 2005, with a standard error of the mean of 11.2 hours (± 38%). When extrapolated across the 209 valid addresses, this amounts to 12, 352 hours ± 38 percent. In total, when aggregated with the 39,086 estimated hours for on-site users, this provides an estimate of 52,158 person hours of use during fall 2005 on the 8,000-acre game area. This amounts to approximately 6.5 person use hours per acre.

3.3 Characteristics of Uses

Each person use is made up of one or more recreational activities. On average, on-site respondents reported that the typical visit involved 3.5 different activities per visit. From these activities, respondents were requested to list the one primary activity for the people in their vehicle. Some form of hunting or trapping was the primary activity for 90 percent of the fall 2005 uses. This does not include hunting-related activities, such as scouting for game or exercising/training dog. Wildlife related activities (all hunting, trapping, fishing, scouting for game, and wildlife viewing), accounted for 97 percent of the primary uses. The 3 percent of primary uses that were non-wildlife related included hiking and other, non-specified uses.

For adjacent residents reaching the game area without a vehicle, 50 percent listed some type of hunting or trapping as the primary use, 27 percent did not use the area, and 23 percent noted a non-hunting/trapping as their primary use. Wildlife related activities (all hunting, trapping, fishing, scouting for game, and wildlife viewing) accounted for 60 percent of primary uses, 27 percent did not use the area, and 13 percent were non-wildlife related uses including hiking, picking berries/mushrooms, and target shooting.

3.4 Use Party Composition

The mean on-site party size per vehicle was 1.52 persons, with 98.1 percent of parties having less than four members. Forty-eight percent of vehicle parties consisted of a solo occupant, 52 percent of two or more people. A total of 98.7 percent of parties had one or more males and 7.9 percent of parties had one or more females. Of the total people in the parties sampled, 6.5 percent were female and 93.5 percent were male. Those under 18 accounted for 12.1 percent of uses, those aged 19-29 had 14.6 percent of uses, 30-49 were 42.9 percent of uses, 50-64 were 24.3 percent of uses and those over 64 the remaining 6.1 percent of uses. A total of 10.6 percent of the uses involved one or more persons in the vehicle party who had a physical impairment that seriously limited their participation in work or recreation.

For adjacent-resident households and their guests, the mean household had 2.5 members. Across all households, including those that did not visit the game area during fall 2005 from their property, a mean of 3.3 persons per ownership used the game area in fall 2005 without parking on or adjacent to it. This amounts to 690 distinct users from adjacent properties.

3.5 Satisfaction with Game Area Use, Users and Management

Of the 182 on-site respondents, 164 rated their satisfaction with the visit and provided the primary reason for their rating. The mean satisfaction rating on a scale of 1 - 9, where 1 was highly dissatisfied and 9 was highly satisfied was 6.8. When grouped by satisfaction category (dissatisfied = 1-3; neutral = 4-6; satisfied = 7-9), 8.5 percent were dissatisfied, 26.8 percent were neutral and 64.7 percent were satisfied. An open-ended question asked about the one most important reason for their satisfaction. Responses were read and then grouped by category. Across the three levels of satisfaction, the

Table 1.—One most important reason for on-site respondent satisfaction rating with Maple River State Game Area use, fall 2005

Most Important Reason for Rating (a)	Dissatisfied (% in column)	Neutral (% in column)	Satisfied (% in column))	Total (% in column)
Game/wildlife abundance	7 (50.0%)	19 (43.2%)	38 (35.8%)	64 (39.0%)
Land/habitat management/ condition	0 (0.0%)	10 (22.7%)	23 (21.7%)	33 (20.1%)
Opportunity/place to hunt	0 (0.0%)	1 (2.3%)	18 (17.0%)	19 (11.6%)
Crime/vandalism (b)	3(21.4%)	5 (11.4%)	4 (3.8%)	12 (7.3%)
Harvested game	0 (0.0%)	0 (0.0%)	8 (7.5%)	8 (4.9%)
Conflicts with others	2 (14.3%)	4 (9.1%)	1 (0.9%)	7 (4.3%)
Companions/solitude	0 (0.0%)	0 (0.0%)	5 (4.7%)	5 (3.0%)
Weather	0 (0.0%)	3 (6.8%)	0 (0.0%)	3 (1.8%)
Non-responsive (e.g. “good day”, “good hunting”, etc.	2(14.3%)	2 (4.5%)	9 (8.5%)	13 (7.9%)
Total	14 (100.0%)	44 (100.0%)	106 (100.0%)	164 (100.0%)

(a) Rating of 1-3=Dissatisfied; 4-6=Neutral; 7-9= Satisfied.
(b) Includes littering, trash dumping, theft of tree stands, shooting of signs, etc.

relative abundance of the game being sought was the most frequently reported reason for the satisfaction rating (Table 1).

For those hunters who were dissatisfied, many reported seeing none or less than expected of the target species. Conversely, for those who were satisfied, expectations for seeing target wildlife were often exceeded. Land management and habitat conditions were a source of satisfaction for some (beautiful, natural, good water levels, etc.) or dissatisfaction for others (too many ponds and not enough upland, need more food plots, etc.). Crime and vandalism were always seen as negative. However, even some users who rated their experience as a 7 or an 8 cited crime and vandalism, one noting “would have left a higher rating, but some pig people left trash, fire debris and garbage at 3 parking sites.” Some responses were connected with only one level of satisfaction rating. Harvesting game and enjoying one’s companions were noted only by satisfied users. Weather concerns were noted only by those who were dissatisfied.

Adjacent owners were asked about their interactions with game area users and game area managers. Their interactions with game area users were often less than satisfying. The mean satisfaction rating on a scale of 1 - 9, where 1 was highly dissatisfied and 9 was highly satisfied was 4.7. When grouped by satisfaction category (dissatisfied = 1-3; neutral = 4-6; satisfied = 7-9), 36.1 percent were dissatisfied, 34.5 percent were neutral and 29.4 percent were satisfied. Key sources of dissatisfaction included trespass, illegal/unethical behavior, litter/trash on their land or adjacent state land, partying (generally at night), shooting in a safety zone (450-foot radius from any dwelling), or increased traffic on roadways. Sources of satisfaction were encountering no problems, and the perception that most game area users were ethical and well behaved.

Regarding satisfaction with game area managers, two key DNR functions are involved, wildlife/property management and conservation law enforcement. Using the same satisfaction scale, the mean satisfaction rating regarding interactions with DNR personnel was 5.9. When grouped by satisfaction category (dissatisfied = 1-3; neutral = 4-6; satisfied = 7-9), 22.5 percent were dissatisfied, 30.4 percent were neutral and 47.1 percent were satisfied. Key sources of dissatisfaction included unfriendly, non-responsive, or unfavorable response to question/concern, don’t see them/no interaction, too many deer, and too few deer and other wildlife. Key sources of satisfaction were friendly, prompt/favorable response to question/concern, see DNR personnel patrolling/working, and like not seeing DNR personnel.

Table 2.—Purchase of selected Michigan outdoor recreation related licenses, permits and registrations during the past 12 months by distinct Maple River State Game Area on-site users, fall 2005

License, Permit or Registration [a]	Percent Purchasing [a]
Firearm Deer Hunt	86.6%
General Fish	77.9
Small Game Hunt	71.6
Archery Deer Hunt	65.4
Boat Registration	46.2
Turkey Hunt	33.7
Daily State Park Motor Vehicle Permit	33.6
Trout/Salmon Fish	29.9
Waterfowl Hunt	23.8
Annual State Park Motor Vehicle Permit	18.7
Off-road vehicle license	11.3
Managed Waterfowl Area (daily or annual)	10.2
Snowmobile Trail Permit	9.2
Fur Harvester	4.7

[a] Many purchased multiple licenses

3.6 Distinct On-Site Users

While each completed on-site questionnaire is from a distinct user, those who are more frequent visitors to the game area are more likely to be sampled than infrequent visitors. To compensate for this frequency-of-use bias, data for questions where individuals are considered as distinct users (an individual) verses distinct uses (an event) are weighted with the reciprocal of the number of uses at the game area the previous year. Hence, a distinct user who visited 10 times in the past year has a weight of 1/10. A person who visited only once last year has a reciprocal of 1/1. This assumes that last year's visitation patterns are similar to the current year. In the case of a new visitor (one who did not visit last year), a weight of 1/1 is assigned. Of the 182 respondents, 12 had responded for two different days. Their second responses were eliminated from analysis as this would be double counting. Of the 170 remaining, 152 provided a number of days they used the Maple River SEA during the past 12 months. The 18 respondents not providing these data were eliminated from further consideration as distinct users as it was not possible to weight those cases.

The mean distinct on-site respondent used the Maple River SGA 4.4 times during the past 12 months and any Michigan SGA (including Maple River SGA) 12.3 times in the same period. However, this mean is unduly influenced by frequent users, who visited game areas up to 160 days in the past 12 months. The median provides a more realistic estimate of typical use, with two as the median number of uses at Maple River SGA and 10 for all Michigan game areas during the past 12 months. When asked about the most important activity for which the DNR manages state game and wildlife areas, 97.5 percent cited some form of wildlife associated recreation (hunting, fishing, wildlife viewing, trapping).

Distinct users at Maple River State Game Area purchased a wide variety of permits and licenses from the DNR and the Michigan Secretary of State to legitimately pursue outdoor recreation in Michigan. Firearm deer, general fishing, and archery deer were the three most common license/permit purchases during the past 12 months for distinct users (Table 2). The mean distinct user had purchased 5.2 licenses/permits/registrations during the past year.

4.0 MANAGEMENT IMPLICATIONS

Recreational use by those driving a vehicle and parking on or adjacent to the Maple River SGA in fall 2005 accounted for an estimated 76 percent of person use hours. It was dominated by wildlife related activities, with hunting being by far the most common. An estimated 91 percent of vehicles parked on the area were

parked in designated parking lots. As parking is readily available along roadsides (available shoulder, no parking restrictions), this high percentage of vehicles parked in designated lots suggests that these parking areas are strategically placed and provide adequate access to the game area.

Overall, while the majority of on-site respondents were satisfied with their recreational experience, key sources of dissatisfaction were identified. They were lack of target species, crime and vandalism such as theft of tree stands and littering/trash dumping, and conflicts with others. Each of these dimensions is within the purview of SGA managers to influence as they involve wildlife management, people management, property maintenance, and law enforcement. For those who were satisfied, the abundance of target species, good land management/habitat, and having a place to hunt accounted for three-quarters of the satisfied uses. Again, each of these factors is influenced significantly by SGA management.

The vast majority (97.5%) of distinct Maple River SGA on-site users cited wildlife related recreation as the key activity for which the DNR should manage. This clearly fits the purposes of game area management. It will be interesting to see if those sampled other times of the year (outside of hunting seasons) have similar views and SGA activities as the study continues for spring and summer. With the mean distinct fall user purchasing more than five licenses/permits/registrations during the past 12 months, SGA users are extremely important in supporting not only SGA management, but also the entire conservation effort of the DNR. For fiscal year 2005-06, 92 percent of the DNR's budget came from user pay licenses and permits and related expenditures (e.g., gasoline sales tax from fuel used in watercraft, federal excise taxes on sporting arms, ammunition, archery equipment, fishing equipment, etc.) and only 8 percent from general tax monies.

Adjacent landowners, their household and guests, when not parking on the game area or an adjacent public roadway, accounted for 24 percent of the person use hours on the game area during fall 2005. Seventy-three percent of ownerships had one or more individuals use their property as a gateway to game area land. These adjacent properties represent many unmonitored access points to game area lands for recreational users. Considering that this is a rural location with the mean adjacent ownership being 90 acres in size and slightly more than half (52%) classified as farms, it may be expected that in a more densely populated area, with fewer large adjacent private ownerships, public use of these private land gateways to SGAs is even greater.

Adjacent owners' satisfaction with game area users and with game area managers is a source of concern. Regarding game area users, the only positive comments are that lack of trouble is viewed as positive and that some believe most users to be ethical. There are a number of substantive problems with game area users, most of which are related to illegal activities including trespassing, vandalism, litter/trash dumping, and shooting in safety zones. The DNR needs to make a well publicized management response to improve both game area user behavior and relations with game area neighbors. This response can be characterized by sources of satisfaction neighbors noted as reasons for their relationship with the DNR. In particular, a friendly, timely response was a key factor in satisfied interactions with the DNR.

The response should take a four-pronged approach. First, the DNR should focus on improved law enforcement through more active patrols by conservation officers and improved working relationships with county sheriff departments. This effort would provide more visible enforcement presence and would improve the ability to apprehend and prosecute violations such as trespassing. Second, through hunter safety education, which is mandatory for all to obtain their first Michigan hunting license (if born after 1976), special emphasis should be put on hunters being good neighbors to those who own private lands adjacent to their hunting sites. Being a good neighbor includes respecting private property, not littering, and respecting all shooting safety zones around residences. Third, the DNR should make better use of its Report All Poaching (RAP) toll-free number to expand coverage beyond poaching to include other violations of public land rules (e.g., trash dumping and vandalism). This could be coupled with a "Game Area Watch" program, similar to neighborhood and park

watch programs, that heighten awareness in violators that they may be observed and turned in by a fellow game area user, not just uniformed law enforcement. This involvement greatly multiplies the "eyes and ears" of land management agencies. Fourth, the DNR needs to work with others to restore game area conditions to those that are desirable. In spring 2006, a local scout troop collected 60 cubic yards of trash and litter from selected parking areas in the game area. A friends group for the Maple River is organizing a summer citizen-oriented canoe trip to illustrate the values and problems of the river corridor within the game area and a corresponding September river cleanup.

5.0 CITATIONS

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