Evaluating Hunter Surveys at Oakwood Bottoms Greentree Reservoir in Southern Illinois

Ethan Dittmer
Southern Illinois University Carbondale, ethan.dittmer@siu.edu

Follow this and additional works at: https://opensiuc.lib.siu.edu/esh_2019

Recommended Citation
Evaluating Hunter Surveys at Oakwood Bottoms Greentree Reservoir in Southern Illinois

By

Ethan Dittmer
Southern Illinois University, Carbondale, IL

A Proposal for Research

Under the advisement of:

John O’Connell
Ph.D. Candidate

and

Dr. Michael Eichholz
Associate Professor

Department of Zoology
Undergraduate
Southern Illinois University Carbondale
September 2018
Introduction

Hunter surveys and human dimensions

Human dimensions research can play a major role in helping wildlife managers and others identify appropriate management actions that are suited for the different kinds of impacts people experience from wildlife (Decker et al. 2004). Modern wildlife conservation in the United States reflects a historical access by citizens to the land and its resources (Organ et al. 2010). This began with early efforts of Americans to protect wildlife and by 1880 all states had game laws (Organ et al. 2012). By the early 20th century, many wildlife regulations were in place, but by the 1920s, it was clear that the emphasis of restrictive game laws was insufficient in addressing wildlife declines (Organ et al. 2010). Aldo Leopold and other conservationists published an *American Game Policy* in 1930 to address this dilemma (Leopold 1930) and (Organ et al. 2012); this policy proposed that a wildlife profession be created with trained biologists supported by funding and universities. Biologists could develop and recommend management strategies for the region of the country they were in, easing the dependence on broad, restrictive laws. A similar emphasis on human-based management is gaining attention in today’s wildlife management, the involvement of stakeholders in management decisions through human dimensions research and application.

Two objectives of wildlife management are to maintain healthy wildlife populations and to provide satisfactory recreation experiences (Johnson 2006). Stakeholders in the wildlife field can be defined as those individuals and groups who may be affected by or can affect fish and wildlife management decisions and programs (Decker et al. 1996). In order to provide satisfactory recreation experiences to stakeholders, managers must know what these stakeholders define as “satisfactory”. Thus, satisfaction cannot be determined without the use of human
dimensions research; multiple factors may influence a hunter’s satisfaction. Hunters may formulate expectations for the fulfilment of desired outcomes before their hunting experience begins (Brunke and Hunt 2007) thus low harvest does not always equate low satisfaction (Vaske et al. 1986) as may be intuitively expected. Managers should learn what hunters view as satisfactory at the site(s) they manage and what factors influence this satisfaction to provide satisfactory recreational experiences on public lands, and citizen surveys are an effective way to accomplish that goal.

Citizen surveys are designed to provide representative input for planning by managers based on citizen attitudes, evaluations, needs, and desires (Glass 1979). The use of citizen surveys provides managers with data and feedback from stakeholders of an area. The North American Waterfowl Management Plan (NAWMP) emphasizes the importance of integrating human dimensions into management to increase waterfowl conservation support among various constituencies (Eggeman et al. 2018). The latest NAWMP emphasizes the use of human dimension research involving all stakeholders, not just hunters; many other stakeholder groups use wetlands, such as bird watchers. That said, hunter-based funding yields over one billion dollars per year towards conservation in North America, over half of which comes directly from license sales (Heffelfinger et al. 2013). With fewer people participating in traditional outdoor activities, it has become harder to achieve conservation efforts (U.S. Fish and Wildlife Service Midwest Region, 2018). Thus agencies such as the U.S. Fish and Wildlife service have begun expanding R3 efforts (recruitment, retention, and reactivation) to increase the number of active hunters because conservation and outdoor recreation go hand-in-hand (U.S. Fish and Wildlife Service Midwest Region, 2018). Citizen surveys can be implemented to gather data from all
groups who use a site for recreation, such as hunters, birders, and hikers; citizen surveys enable managers make decisions that consider all users of a site.

The latest NAWMP also recommended the collection of recreational data at the site scale to complement national data sets (Devers et al. 2017). Rapid technological development has led to multiple means for conducting surveys on a site scale; mail, email, and online surveys are available to reach survey populations (Dillman et al. 2014). Each method has its own merits and drawbacks. Mail surveys require postage, staff to place and review them, and material costs but can provide an accurate return rate. A study on methods to survey waterfowl hunters in Louisiana found that the cost per usable mail response was $39.10 in 2010 (Laborde 2014). Open-web surveys are available for anyone to access with a URL or QR code and can have lower cost; that same study found that each usable open-web survey cost $5.00 in 2010 and lowered to $1.50 in 2013 (Laborde 2014). However, open-web surveys may be susceptible to false reports and cannot provide a true return rate. Other methods of surveying such as check stations, survey drop boxes, and phone reporting require personnel to implement, collect, and process surveys, incurring substantial expenses. Public meetings have been shown to attract hunters who harvest more ducks, hunt more counties, and have hunted longer than hunters reached by a random mail survey (Alessi and Miller 2012). Thus, these meetings will likely not provide a representative sample of all hunters. Public meetings can be useful to convey willingness to work with and hear the thoughts of those who use the land for recreation, and should be incorporated for major management considerations, but are likely not the best method to track users’ opinions over time.
Background on Oakwood Bottoms

After guidance from the 1958 Mississippi Flyway Council “Guide for Management of Waterfowl in the Flyway” and in response to the disappearance of wetland habitat in the Midwest US, construction began on the Oakwood Bottoms Greentree Reservoir (hereafter Oakwood Bottoms) in 1964 (Deaton 2014). The loss of wetlands was substantial in Illinois from the 1780’s to the 1980s’, during which Illinois lost 85% of its wetlands (Dahl 1990). The area that eventually became Oakwood Bottoms was previously intensively farmed before it was acquired and modified by the federal government (Thomson 1971). Oakwood Bottoms quickly became a popular site for duck hunters. The 2000 ducks harvested during 2412 hunter-use days in 1965 ballooned to 15,847 during 12,148 use days in 1967 (Jenkins 1969). In 1975 Oakwood Bottoms had the highest number of hunters among the popular public waterfowl hunting areas monitored in Illinois with 11,463 hunter-use days (Hamer and Arthur 1976). From 1965-1977 a total of 84,766 hunter-use days were estimated at Oakwood Bottoms with a total harvest of 62,415 ducks over that period (Hanson 1978).

Need for monitoring at Oakwood Bottoms

Oakwood Bottoms could benefit from an increased focus of human dimensions so that staff may learn more about hunters’ opinions and how management decisions are affecting hunters and harvest. Monitoring is a critical step to better understand current management systems and to forecast effects of any changes to management approaches or techniques (Riley et al. 2002). Two regulatory changes at Oakwood Bottoms that directly impacted access and potentially hunter satisfaction were the decisions to close hunting at 1 p.m. daily and to close a substantial portion of the property to access during the waterfowl season. Afternoon closures have previously been applied to manage hunting pressure. Minnesota first applied a 4pm daily
duck hunting closure in 1973 to limit disturbances to ducks during roosting flights and evening feeding (Kirby et al. 1976). This regulation was in response to downward trends in the states breeding populations of mallards (*Anas platyrhynchos*) (Kirby et al. 1976) and (Jessen 1970). During the years of afternoon closures, recovery rates of mallards were lower than non-afternoon closure years (Kirby et al. 1983). There were other regulations implemented with specific goals during this period as well, such as a split season to protect migrating redheads and canvasbacks (Kirby et al. 1976). Harvest data can enable researchers or managers to evaluate regulations and the effectiveness of them. Results were inconclusive in determining if mallard survival rates were similar during sunset closure years and afternoon closure years; it was determined that harvest rates of females and young males were higher during sunset closure years (Kirby et al. 1983). The 1,200 acre refuge was implemented in 2015 at Oakwood Bottoms in hope of attracting more ducks to the overall property because hunters had been reporting seeing less ducks using the area (Winkeler 2015). Staff publicly stated that the refuge would likely be in place for 3-5 years as a trial and then would be evaluated for future implementation (Winkeler 2015).

Harvest data has not been thoroughly collected during the refuge period. An informal hunter survey was conducted by Oakwood Bottoms staff at about the time when the refuge was implemented, but that data has not been analyzed. Waterfowl refuges typically increase the number of ducks a site can hold and increase harvest in a 25-mile radius of the refuge (Bellrose 1954). Waterfowl can concentrate in very large numbers at these refuges that are often used for resting and desultory feeding, but disperse from the refuge to feed (Bellrose 1954). However, a 1990-91 study in southeastern Arkansas found that mallard use greentree reservoirs for both refuge and feeding; mallards were found to consume large quantities of natural foods when they
were available within the greentree reservoir even though agriculture seeds were in close proximity elsewhere (Dabbert and Martin 2000). That finding suggests that a refuge in a greentree reservoir may not have the same effect as a refuge in a marsh; indeed, mallards may not disperse as widely to feed in other areas and habitats. Without recently collected harvest data the impact of the refuge on harvest cannot be evaluated. Although it would be most useful to compare pre-refuge harvest data to current harvest data during the refuge period, harvest data collected now could still serve as a baseline if future changes are implemented, with consideration for other potential influences on harvest during such a short evaluation period.

Substantial funding has recently been used to improve habitat and infrastructure for hydrological management at Oakwood Bottoms, including a portion of the combined three million dollars provided via a North American Wetlands Conservation Act grant and partner matching funds. The effects of those improvements should be monitored and studied to improve future management decisions and to inform and include all stakeholders of results and future plans. Improvements in waterfowl habitat are often met with high harvest, and harvest surveys enable managers to monitor these changes in harvest. Although it can be difficult to attribute any changes in harvest to a single cause, there are some instances where changes in harvest were likely influenced by measurable changes in the habitat. For example, Oakwood Bottoms had little food and poor harvest during the 1972-73 duck season, the following year during the 1973-74 duck season a good crop of acorns was implicated as the main cause for a 217% duck-harvest increase at Oakwood Bottoms (Kennedy et al. 1974).

**Current Management Issues**

Oakwood Bottoms is currently undergoing a shift in its forest composition from pin oaks to ash, resulting in a decrease in acorns for waterfowl forage. A 1971 study of Oakwood Bottoms
found that the original hydrology of the forest had been upset by the compartmentalization of the reservoir, levees were believed to have impeded proper/normal drainage (Thomson 1971). Pin oaks have been shown to be very susceptible to injury by flooding as well as an increase in the water table, while white ash is more resistant to damage from flooding (Yeager 1949). Managers and biologists at Oakwood Bottoms mostly agree that a major contributor to the decline of pin oaks is their inability to flood and drain the site quickly due to insufficient pumping and draining infrastructure. Recently, pumping has begun early in autumn, before the oaks have senesced, because staff wanted to ensure that the wetland compartments are flooded in time for waterfowl season. Managers also face an uphill struggle in the spring when they are unable to drain the wetlands via gravity to the Big Muddy River, which is often flooded during the wet season to a higher elevation than the wetland cells, resulting in oaks that are still flooded at the start of the growing season. It has been recommended that if an undesirable shift in forest composition takes place at a greentree reservoir due to poor drainage, drainage should be improved, the reservoir should only be flooded every second or third winter to permit through soil drying and aeration, or duration of flooding should be reduced to have no chance for overlap into the growing season (Newling 1981). A multi-million dollar improvement project is being considered by the US Army Corps of Engineers for Oakwood Bottoms that will aim to improve hydrological control. It will be important to involve hunters in the planning process, so they may provide feedback on proposed changes.

Public input is essential for sound natural resources management (Alessi and Miller 2012). A lack of information about those who use Oakwood Bottoms for recreation has led to a perceived disconnect between managers and users of the site. Hunters have expressed that they do not have sufficient opportunities to provide input, nor do they receive adequate explanation
for management decisions at Oakwood Bottoms. Some individuals were so upset with the decision to implement the refuge that they simply stopped hunting the area. In a well-designed stakeholder system, participants should be able to directly help managers identify, prioritize, and weigh management decisions. Human dimensions research is needed to ensure complete and up-to-date information regarding the public’s interest and expectations of management decisions are available to managers (Decker et al. 2015).

**Implementing a hunter survey at Oakwood Bottoms**

The use of a survey at Oakwood Bottoms will allow the collection of harvest and opinion data while the refuge is still in place and will allow comparison should the refuge area be removed in the coming years. A survey will provide hunters with an opportunity to provide feedback about the refuge and other management topics. Research suggests that different hunters have varying motivations for hunting and may seek different experiences when hunting and that it is important to manage for different types of hunters (Schroeder et al. 2006). Those who continually return to Oakwood Bottoms to hunt the flooded hardwood timber that is unique among southern Illinois public sites are likely a different type of hunter, as compared to most other duck hunters in southern Illinois, and may have different motivations or opinions. Oakwood Bottoms is also used for non-hunting activities such as birdwatching. It is important to learn about the attitudes, motivations, and values of both hunting and non-hunting user groups so that management decisions can account for their interests.

**Type of survey for Oakwood Bottoms**

A previous study at Oakwood Bottoms (Sweet 1976) recommend that the U.S. Forest Service encourage more research on duck populations and habitat utilization to facilitate management for adequate duck habitat to supply a quality experience for waterfowl hunters. If
an agency or manager at a specific site, such as Oakwood Bottoms, wishes to implement a hunter survey they often have multiple options to do so. Considering that Oakwood Bottoms does not require reporting from those who hunt or use the area, the survey must be voluntary and readily available to those who enter the area. I have identified two options for conducting such a survey. The first is an open web-based survey that will be accessed by hunters that follow a URL/QR code to the survey found on signage places at the most popular access points at Oakwood Bottoms. The second is a paper survey that will be placed on all vehicles parked along a predetermined route at Oakwood Bottoms that includes the aforementioned access points. This survey will be completed by hunters and then mailed in. A study on hunter surveying methods during the 2010, 2012, and 2013 Louisiana waterfowl seasons found that on a Louisiana-wide level, open-web surveys provided a quick, inexpensive, and efficient way to investigate stakeholder attitudes but also warned against their use for demographics, effort, or harvest unless the objective of the survey is to assess avid users of the resource or to establish an index of effort and success (Laborde 2014). The Oakwood Bottoms survey will seek to collect stakeholder attitudes and any harvest or satisfaction data will be regarded as an index.

Before implementing formalized efforts by Oakwood Bottoms staff to collect hunter information, a trial period is necessary to conclude whether an open-web survey, paper/mail-in survey, or a combination of both is best suited for use at Oakwood Bottoms. My primary concerns are response rates and various biases in responses that may be related to each survey type. I will be unable to calculate a true return rate, but by counting vehicles on survey days I should be able to develop an index of apparent return rate. That index will allow us to evaluate which survey type garners the highest apparent return rate. One potential source of variation in responses would be if responses were related to respondent age. A 1969 study of hunters at
Oakwood Bottoms found 46 percent of hunters were age 16-24 and 41 percent were students, presumably due to the close distance from Southern Illinois University Carbondale (Jenkins 1969). If response rates, or responses themselves, show directional biases to different use of each type based on age, then that would need to be considered if a single method is used in the future. I hope to identify biases and other flaws in either method of surveying during this project to develop recommendations regarding which method or combination of methods is best suited to be used in the future.

**Survey purpose and research questions**

To answer the questions that the staff of Shawnee National Forest are interested in learning from hunters and to investigate potential differences in responses between open-web and paper surveys, I will implement an open-web based survey with signage at Oakwood Bottoms and a mail-in paper survey that will be placed on hunters’ vehicles. The results of both surveys will be analyzed after the close of duck season. A full report will be provided to the managers of Oakwood Bottoms addressing the responses received from hunters as well as a plan for future hunter surveys at Oakwood Bottoms and additional recommendations. My research questions are the following:

1. Which type of survey, mail-in or open-web, will receive higher apparent response rate?
   
   Hypothesis: Open-web surveys are readily-available to more hunters than mail-in surveys at Oakwood Bottoms.
   
   Prediction: I will receive a higher apparent response rate from open-web surveys than mail-in surveys.
2. Do repeat survey respondents express lower satisfaction than those who only submit one survey in a season?

   Hypothesis: Repeat survey respondents will have hunted at Oakwood Bottoms more than those who submit one survey and have more knowledge of management of the area.
   Prediction: Repeat survey respondents will express lower satisfaction than those who submit only one survey.

3. Are hunters’ free responses more critical on open-web or mail-in surveys?

   Hypothesis: Hunters complete mail-in surveys more thoroughly and detailed than open-web surveys.
   Prediction: Hunters free responses will be more critical on mail-in surveys than open-web surveys.

4. What do hunters at Oakwood Bottoms deem a satisfactory hunting experience?

   Hypothesis: Previous hunting experiences at Oakwood Bottoms and other locations will influence hunter satisfaction
   Prediction: A range of factors may influence what determines a hunter’s satisfaction with their hunt. The largest contributor to variation in satisfaction will be previous experiences duck hunting at Oakwood Bottoms. Weather and age will also contribute to variation in satisfaction.

5. Why do hunters choose to hunt at Oakwood Bottoms?

   Hypothesis: Hunters choose to hunt at Oakwood Bottoms because of the opportunities it has to offer them that other sites do not.
   Prediction: Hunters primarily choose to hunt at Oakwood Bottoms because of the flooded timber, ease of access, and previous or anticipated success.
The results of this study will be useful to site managers at Oakwood Bottoms, and possibly for similar or nearby sites, to learn if an open-web survey, placed mail-in survey, or combination of the two can increase their understanding of human dimensions and aid them in applying these findings to their management. Managers of Oakwood Bottoms will gain an understanding of what hunters view as a satisfactory hunting experience and issues hunters are concerned at Oakwood Bottoms. These findings can then be applied towards management and addressed in future surveys to help provide a better experience for hunters. Managers will also learn about the demographics of those who use the area and how far they travel to visit the site. In addition to information from duck hunters, managers may learn about others who use the site during hunting season, such as birdwatchers and deer hunters if they also participate in the surveys. The harvest information may also prove useful as an index of harvest rates for comparison to potential future surveys, with the understanding that there are likely influences on harvest rates that arise from outside the study site.

**Methods**

I will conduct this survey during the 2018 Illinois South Central zone’s regular duck season that runs from November 10\(^{th}\) 2018 to January 8\(^{th}\) 2019 in southwestern Illinois at Oakwood Bottoms. The survey calendar (Table 1) was developed to balance sampling effort, randomization, and representation of days of the week throughout the season. The sampling effort will be limited to 36 days out of a possible 60 due to logistical constraints. Every weekend day will be sampled during the season. Two weekdays were randomly selected from the first week of the season and will be shifted forward by one day each week. For example, sampling on Tuesday and Friday during the first week will shift to Monday and Wednesday for the second
week. Two additional weekdays were randomly selected from the remaining available weekdays of the season to balance the sampling effort between weekends and weekdays at 18 apiece (Table 2). Within each weekend pair and each weekday pair, one day was assigned as paper and one day was assigned as online.

I will start each sampling day 15 minutes before the sunrise time listed in the IDNR hunting digest, which equates to starting 15 minutes after the start of legal shooting time. I expect to finish the route (Figure 2) by 15 minutes after sunrise (i.e. 45 minutes after legal shooting time). Reversal of the route will be randomly determined each day and will be recorded. I will use a GPS to record the location and number of vehicles parked along the route. The sampling period start time was selected to balance reaching respondents that have already arrived and are still arriving while also catching most respondents before they depart. The time I am able to complete the route will vary on number of vehicles to be surveyed, weather, and other factors that are out of my control, but should not frequently affect the number of respondents surveyed. General data will be recorded each sampling day, such as weather conditions, road conditions, and other potential distributions to hunting. The start and end time of each sampling day will be recorded for quality control.

Survey Design

The survey (Appendices B & C) will ask respondents to provide demographic information, harvest data, and responses to other subjects related to their hunt. Hunters will also be asked why they are hunting at Oakwood Bottoms and if they plan to return. Hunters will then be asked to provide satisfaction ratings and information on number of times they have hunted. The final portion of the survey will ask hunters to rate the effect of the refuge on their hunting while offering a space for comments on the refuge and another section for general comments.
Hunters that hunt together may have more similar views and harvest than hunters in other parties. Thus, hunters in the same party may be considered dependent and their survey results merged into a single response for the overall party, with the party serving as the sampling unit. This assumption will be evaluated using tests for independence before any data reduction and both hunter and hunting party may be used as the sampling unit for different analyses (e.g. hunter as the sampling unit for age-response correlations, but hunting party for date-response or frequency-response evaluations). I will use an envelope numbering system and a pair of questions about who the respondent hunted with to help identify hunting parties.

The survey will be available to respondents in two formats, open-web and paper survey cards to be mailed in. The surveys will ask hunters the same questions with the exception that the open-web survey will ask hunters if they completed a paper survey that day, this will be used to censor duplicate responses. An informational letter (Appendices D & E) will be available to all hunters, regardless of survey type. It will provide further information about the project and will include a map of Oakwood Bottoms that will define the sections I will be referring to as north and south within the site.

**Paper**

Four paper surveys and prepaid envelopes (Appendices B & C) will be placed in a plastic bag along with four informational letters (Appendices D & E). Each envelope within a bag will be numbered the same so that I can relate individual responses back to vehicles. This, combined with a question asking for the initials of any other members of their hunting party should help with potential independence issues. The mail-in survey will only be available to hunters on “paper” days.
Ten signs (Appendix A) will be placed at locations that were selected by expert feedback as the most common access points for hunters at Oakwood Bottoms (Figure 1). While these signs won’t be seen by every hunter, they should be seen by the majority of hunters using the property and should provide substantial representation. These signs will include a short description of the project and a URL and QR code that will direct them to the open-web survey. The posts the signs are on will also hold a brochure box which will contain copies of the informational letter (Appendices D & E). This survey will be available for each potential respondent to complete every day of the season that they are at the site. This survey will be available for anyone to complete by accessing the URL or QR code. I will not promote the survey anywhere besides for the ten signs placed at Oakwood Bottoms to limit outside participation. Respondents will be asked for the number of vehicles in their party as well as other party members initials, and if they also completed a paper survey that day, this should help limit potential independence issues and censor duplicate surveys.

Data Processing

Most of the data will be recorded directly from the nominal responses received. Free responses to questions 7 and 8 (Appendices B & C) will be recorded and classified based on the subject of the response, such as flooded timber, ease of access, or previous success; they may also be classified as positive or negative. Free responses to questions 16 and 17 (Appendices B & C) will be reviewed and categorized as positive, neutral, or negative responses. All free responses will then be further classified based on the subject of the comment into categories such as “water levels”, “low harvest”, “too many hunters”, etc. For example, if a hunter responded to
question 17 stating that he heard shots often before shooting time and another hunter responded stating that she has observed hunters harvesting over their limit, both answers would be placed into a response of “enforcement issues” or similar. Free responses from an individual survey may be categorized into multiple categories, as applicable. Multiple surveys from the same respondent on the same day and any suspected false reports will be excluded, but the number of repeats and suspected false reports will be recorded for each survey. An example may be if a high number of open-web surveys are submitted within a short time frame and are seemingly similar/faulty, or responses received greatly exceed four times the number of automobiles counted during the survey that day. A false report will be determined during data processing as a report that is unrelated to the survey or believed to be faulty.

Data Analyses

I will test data to verify that they meet the assumptions for parametric tests and will attempt to transform those that do not. Hunting party independence will be evaluated with tests for independence and the sampling units adjusted accordingly. Two-sample t-tests will be used to test for differences between open-web and paper responses. I will conduct exploratory correlative analyses looking for relationships between each of the responses. If sufficient data is collected, multiple regression analyses or multiple correlation analyses will be used to evaluate the relationships between hunter satisfaction and parameters such as temperature, # of vehicles at Oakwood, etc. Heat maps will be created in GIS software to visualize any changes to the index of use of parking areas throughout the season. If I have sufficient responses to the question that asks which specific wetland unit the respondent hunted in, then I will create heat maps representing an index of use at the unit level. It is likely that hunters will be unwilling to answer that question for fear of revealing their “secret spot”.
Materials/Costs

- (12) “Online Survey” Signs. Appendix A. These signs will allow the open-web survey to be available to hunters every day of the season and will be visible to most hunters at Oakwood Bottoms. *(Two spares in case of theft or damage)*
  - (12) aluminum 12”W by 18”H signs (two .008” pieces of aluminum with a solid polyethylene core (total thickness of .077” inches) - $313.92 or
  - (12) rigid plastic 12”W by 18”H signs (thickness of .12”) - $258.84
  - The signs will also require the following:
    - (10) metal 8’ Green Parking Sign Posts (U-Channel Posts) - $284.50
    - (20) 5/16” x 2” galvanized bolts with (20) washers, (20) nuts, and (20) lock washers* - $37.50
      *bolt length, size, nuts, and washers will need to fit the selected U posts, the size can vary
    - (10) brochure boxes to attach to posts of “Online Survey” signs to hold informational packet/map that designates north and south of Oakwood - $131.00
    - Mounting hardware - $37.50

- (2500) Printed informational packet sheets. Appendices D & E.
  - 2500 sheets of 8.5x11 24lb paper ($45)
  - Ink ($150)

- (2000) Printed surveys
  - 2000 sheets of 8.5x11 32lb paper ($80)
  - Ink ($250)

- Business reply mail envelopes to be used by hunters to return paper surveys
- 2000 #10 envelopes and printing (SIUC printing and duplicating) ($170.97)
- 1000 business reply mail envelopes returned by hunters (SIUC campus mail) ($610.00)
  - I anticipate a return of near 1000, the additional envelopes are in case of a higher return than expected, this would raise total postage costs.
  - I was quoted at 61 cents of postage per envelope returned. If Shawnee National Forest can provide business reply mail services that would be preferred, provided envelopes were directed to me at SIUC.
- (500) Zip-lock bags to hold the paper surveys, envelopes, and information packets that will be placed on hunter’ windshields - $100.00
- (1000) golf pencils - $80.00
- Estimated total millage of project is 1908 miles, this is calculated from 36 round trips from SIUC campus to Oakwood Bottoms including the survey route - $1039.89 at $0.545/mile or $410.95 at $2.80 per gallon
- Cost to purchase a domain and hosting for the survey - $50.00
- **Total anticipated cost:** $2699.26 - $3380.28

**Anticipated Outcomes**

With this study, I aim to produce three manuscripts to each serve multiple purposes. I will submit overall findings in a paper to be submitted to SIUC to satisfy my senior seminar requirements. I will produce a report to the National Forest Service with summaries of responses and trends, a relative usage heat map, raw data for future comparisons, and other information related to their management of Oakwood Bottoms. I will also submit an article that evaluates the
research questions outlined above to a peer-reviewed journal. My ability to statistically test the
data, infer from the results, and thus publish in peer-reviewed journal will be limited by
participation and corresponding sample sizes. Nonetheless, a poor return rate for both survey
types would still be a notable result considering increasing efforts to collect hunter harvest
information in the U.S.

The results of the study will also be presented at regional and national wildlife
conferences to share the results of the study while aiding my professional development. The use
of human dimensions in wildlife management continues to gain importance for many
organizations. Most studies on hunter surveys have been on a broad, state or nationwide level.
This particular study will prove useful to site managers who wish to learn more about the
stakeholders of the site that they manage.

I hope that the survey will be continued into the future at Oakwood Bottoms. This would
enable tracking of hunter success and opinions over time, information that would be helpful for
future management. By knowing where expectations are not being met, and what components
have the greatest influence on satisfaction, Oakwood Bottoms managers will gain a better
understanding of how to serve their stakeholders (Brunke and Hunt 2007). The survey will
provide managers with stakeholder opinions, I expect that this will include both positive and
negative comments. These responses will enable managers to focus on important issues to
hunters and to manage in a way that reflects stakeholder values and provides a positive
experience for those who use Oakwood Bottoms for recreation.
Tables and Figures

Table 1. Survey schedule showing the type of survey conducted each day. Regular duck hunting season for 2018 in the Illinois south central zone runs from November 10th to January 8th.

* indicates the two weekdays that were randomly added to balance sampling effort between weekends and weekdays.
Table 2. Sampling schedule condensed from Table 1. There will be an equal number of online and paper survey days. Weekends were prioritized due to logistical constants and the anticipation of more hunters being present than weekdays.

<table>
<thead>
<tr>
<th>Survey Day</th>
<th>Online</th>
<th>Paper</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Monday</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Tuesday</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Wednesday</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Thursday</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Friday</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Saturday</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>18</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
Figure 1. Yellow pins represent the anticipated locations where the online signs will be placed.
Figure 2. Map of the anticipated survey route. The route will be completed in the direction indicated by arrows, or will be completed in the opposite direction, to be determined randomly each day. This route is subject to change based on road closures for construction.
Appendices

Appendix A. Example of signs that will be placed at Oakwood Bottoms. Ten of these signs will be placed on the property. I anticipate these signs being 12 inches wide and 18 inches tall, printed aluminum or rigid plastic and mounted on an 8-foot tall green U-channel posts. A brochure box will be attached on the posts to hold the informational letters.
Appendix B. Page 1 of the paper survey that will be placed on vehicles on “paper days”.

Oakwood Bottoms Hunter Harvest Survey – Mail Survey

I was hunting (check): Waterfowl ___ Deer ___ Other (please specify) ___ or I was not hunting ___

Please carefully complete this survey. Your participation is appreciated.

# of vehicles in your party (hunted same spot): ____. Initials of hunters in your party: __________

<table>
<thead>
<tr>
<th>Your Initials (Ex: Ethan Dittmer = E D)</th>
<th>Your Birth Year (Ex: 1997)</th>
<th>Your State of Residence (Ex: IL or MO or AR or etc.)</th>
<th>Ducks <em>all species total</em></th>
<th>Deer Your # harvested today AND sex of deer</th>
<th>Other Species Please specify other harvest</th>
<th># of Hours You Hunted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Please check next to all of the year(s) that you have purchased a hunting license in Illinois.

   __2014  __2015  __2016  __2017  __2018

2. How many shells did you fire today?
   • __________.

3. How many ducks do you estimate that you observed in the sky while hunting today?
   • __________.

4. Did you cripple any ducks today that you could not recover? If so, how many?
   • __________.

5. Did you hunt the north or south end of Oakwood today? (see included map)
   • __________.

6. What unit did you hunt in today? **OPTIONAL** (ALL responses sealed until end of duck season)
   • __________.

7. What motivated you to hunt at Oakwood Bottoms today and not somewhere else?

   __________________________________________

   __________________________________________

8. Are you planning to return to Oakwood Bottoms again? Why or why not?

   __________________________________________

   __________________________________________

Please complete both sides of the survey.

TURN OVER
Appendix C. Page 2 of the paper survey that will be placed on vehicles on “paper days”.

### Oakwood Bottoms Hunter Harvest Survey – Mail Survey

Please see the highlighted section at the top of each table to ensure accuracy of survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Scale 1-6</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. How satisfied are you with your hunting experience at Oakwood Bottoms today?</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>10. How satisfied are you with your harvest at Oakwood Bottoms today?</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>11. How satisfied are you with current management practices at Oakwood Bottoms?</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
</tbody>
</table>

*Please answer as accurately as possible (Do not select a range)*

<table>
<thead>
<tr>
<th>Question</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. How many days have you hunted at Oakwood Bottoms so far THIS season?</td>
<td></td>
</tr>
<tr>
<td>13. How many days have you hunted anywhere so far THIS season? (All locations including Oakwood)</td>
<td></td>
</tr>
<tr>
<td>14. How many days did you hunt at Oakwood Bottoms LAST season?</td>
<td></td>
</tr>
<tr>
<td>15. How many days did you hunt LAST season? (All locations including Oakwood)</td>
<td></td>
</tr>
</tbody>
</table>

**16. How has the refuge affected your hunting at Oakwood Bottoms?**

*Please circle the corresponding # (1—very negative effect... 3—no effect... 5—very positive effect)*

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

*Why/How?*

**17. We would like to provide the managers of Oakwood Bottoms with feedback from hunters to help them to make informed decisions to provide the best experience possible for hunters. Please provide your feedback and opinions about Oakwood Bottoms.**

---

Thank you for completing this survey, your participation is appreciated.

Please complete both sides of the survey
Appendix D. Page 1 of informational letter for both surveys. A copy will be included with each paper survey placed on a hunter’s windshield and copies will also be placed in brochure boxes fastened to U-channel posts that are advertising the open-web survey. We would like to use an updated flood map.
Appendix E. Page 2 of informational letter for both surveys. A copy will be included with each paper survey placed on a hunter’s windshield and copies will also be placed in brochure boxes fastened to U-channel posts that are advertising the open-web survey. We would like to use an updated flood map.
Literature cited


Newling, C. J. 1981. Ecological Investigation of a Greentree Reservoir in the Delta National Forest, Mississippi. Miscellaneous Paper EL-81-5, Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss., Assistant Secretary of the Army - Department of the Army - Washington, D.C.


Winkeler, L. 2015. For ducks only: Part of Oakwood Bottoms designated refuge. The Southern.

26 November 2015.