PROJECT STATEMENT

State: Oklahoma **Grant Number:** F20AFXXXX (W-206-R-1)

Grant Program: Wildlife Restoration

Grant Title: Visitors' characteristics and economic contribution of WMAs in Oklahoma

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Grant Period: 1 January 2020 – 31st December 2021

Project Description:
Provision of public recreation lands such as Wildlife Management Areas (WMAs) involves economic costs in terms of the acquisition, protection, and maintenance. While these costs are readily quantifiable, public benefits provided by WMAs are difficult to monetize. Therefore, proposals for new WMAs or any future consideration for investment in the Oklahoma WMA system may benefit from having some reliable estimates of economic benefits WMAs bring to local communities (e.g. county). Estimates of economic impacts (e.g. expenditures, value added, and jobs) WMAs create at county and state level will help inform the relevant stakeholders on the economic importance of WMAs and justify investment in such public lands.

Hunters and anglers as the users of WMAs help inject substantial dollars into local economies. For example, the International Association of Fish and Wildlife Agencies (2002) estimated the statewide total economic impact of all hunting activities in Georgia to be more than a billion dollars, including jobs, salaries and wages, sales and fuel taxes, income taxes, and other multiplier effects. A number of such studies have examined the aggregate cost and benefit of such public land management programs at the state or national level, but little is known about the impact of WMAs to local, county-level economies. In addition to economic impacts, the overall economic benefits of WMAs also include the net economic value or willingness-to-pay (WTP) which is the benefits to visitors themselves from recreating at WMAs. Therefore, quantification of overall benefits and costs of managing WMAs allows comparison of the economic benefits of WMAs with other types of competing uses of public land.

Need Statement:
The Oklahoma Department of Wildlife Conservation (ODWC) has minimal data on public land use for hunting. Understanding how its constituents are using currently-owned public lands would inform how the agency might adapt management practices on current properties, as well as attributes of land that are most desirable to users for consideration in determining future land

acquisitions. This information will aid the biologists in ODWC with fiscal resource allocation on ODWC managed areas with hunting access. Finally, to determine the economic contribution of public hunting areas on surrounding communities, an economic contribution model based on users spending would help the agency to understand the monetary benefits to towns near these areas. The economic contribution of public hunting areas may justify further land acquisition, as well. Currently, there is no data on how much or little the WMAs across Oklahoma contribute to rural communities surrounding them. Support for WMAs may increase, if it is shown they positively impact citizens of Oklahoma.

Purpose:
The purpose of this research is to determine visitor preference for and use of Wildlife Management Areas in Oklahoma to better inform current management practices and future land acquisitions by ODWC. The economic impact of these managed hunting areas on surrounding communities will also be explored.

Objectives and Approach:

Objective 1: (TRACS Strategy: Research, Survey, Data Collection, and Analysis)
Conduct 1 investigation by December 31, 2021.

Activity Tag 1: Human Dimensions related data acquisition and analysis – 1 investigation

Narrative sub-objective: Evaluate current use of public hunting areas and establish a model displaying visitor satisfaction to the given WMAs in Oklahoma.

Approach:
The objectives of this study will be met by proposed work in two phases. The first phase will involve modelling on level of users' satisfaction with WMAs.

The population of WMA users in Oklahoma includes both traditional users such as hunters, fishermen, and non-traditional users such as bird watchers, hikers, nature photographers etc. Traditional users such as hunters and anglers, access WMAs by purchasing a hunting or fishing permit. For estimation of WMA use and expenditure by this traditional user group, we will employ a stratified random sampling of users with the permit and license database to be provided by ODWC. The second group users require annual conservation passports that do not provide fishing or hunting privileges. Although significantly fewer conservation passports are sold (versus traditional licenses), conservation passport holders also need to be accounted for their economic contributions to the local economy.

Sampling allocation will follow the proportion of traditional licenses (hunting or fishing) and conservation passport holder categories but any appropriate adjustment (over- or under-sample some license groups) will be done after initial analysis of license database, if necessary. In sampling allocation, we will also include both residential and non-residential permit holders. Since survey administration in all WMAs of Oklahoma is a cumbersome task, we will select six representative WMAs that are different in level of use, ecosystem types, acreage, and amenities available and recreational opportunities available. The ODWC field biologists and human dimension specialist will be consulted for WMA selection.

Finally, since hunters are less likely to visit the WMA located far from their residence (Hussain et al. 2016), we will use the following sampling frame to choose survey respondents:

a) License holders residing within 30 miles from WMA will constitute the 50% of total sampling population.

b) License holders residing between 30-70 miles from WMA will constitute the 30% of total sampling population.

c) License holders residing beyond 70 miles from WMA, including non-residents, will constitute the remaining 20% of total sampling population.

A survey questionnaire will be designed to solicit data on WMA users' trip profile (annual trips and number of days, WTP for hunting, primary and secondary recreation activities, party size etc.), general and specific expenditure on a variety of items (WMA permit, gasoline, food, lodging, equipment, etc.), and additional questions related to their preference of WMA for recreation activities, availability of substitute sites for preferred recreation activity etc. Many of these questions will be adopted from ongoing study by the Principal Investigator (Joshi) in Canton Lake. Since the project envisions to use license hunter data, the mail survey will be submitted to ODWC for their approval and confidentiality agreement will be signed. The final survey will be submitted for IRB approval at Oklahoma State University. The ODWC will be informed in case IRB approval required significant modification in the survey instrument.

Data collection procedure will utilize a combination of mail and email survey. For mail survey, a modified Dillman Method (Dillman, 2014) will be adopted with three waves of mail including 1- a pre-notification post-card, 2- a personalized cover letter along with a packet containing a copy of survey, and pre-paid business reply envelope, and 3- a follow up reminder letter along with a packet containing a copy of survey and pre-paid business reply envelope. The cover letter will also include a URL where they can go and complete the survey online if they prefer. For email survey, the same questionnaire will be placed in a secure website (Qualtrics) and those in the sample with email address will be contacted by email to participate. So, the purpose of email survey is not targeting users outside of the original sample, but to supplement mail correspondence to reach out to as many respondents in our sample as possible.

PIs will submit a de-identified release dataset with a corresponding codebook, and any additional relevant electronic files (e.g. GIS layers) in accordance with the requirements specified in the approved IRB protocol in place at the time of contract approval. Data will be provided as an SPSS, text, and/or Excel files as agreed upon by the contract sponsor.

Visitor satisfaction: A component of mail-back survey instrument will include a range of human dimensions questions related to visitor perception and attitude towards WMAs, importance of and satisfaction with overall recreational experience (hunting, fishing, hiking etc.). Other questions will include items on sense of place, place attachment, place dependence etc. to examine how visitors view the WMA as part of their personal and community identity, and how dependent they are on the WMAs for outdoor recreational activities. A deeper understanding of place attachment and dependence will help managers predict how the community may react to

any programs impacting current use. Qualitative assessment of those will involve utilizing a range of statements provided with a 5-Point Likert-scale option to allow respondents indicate their answers. An ordinal logistic regression model will be used for satisfaction modelling.

Objective 2: (TRACS Strategy: Research, Survey, Data Collection, and Analysis)
Conduct 1 investigation by December 31, 2021.

Activity Tag 1: Human Dimensions related data acquisition and analysis – 1 investigation

Narrative sub-objective: Conduct an economic analysis of WMAs on surrounding communities.

Approach:
The second phase will develop and estimate Input-Output models at the county and state level to calculate the estimated impact of expenditures by WMAs users on local and regional economy.

Economic Analysis: We will adopt Input-output (IO) analysis using an IMPLAN (Economic Impact Analysis for Planning) tool that is commonly used in characterizing economic impact of outdoor recreation industry such as hunting and fishing. Direct impacts are those dollars spent directly on recreational activity and kept in the economy, and secondary impacts include supporting businesses that supply raw materials to the direct businesses. Finally, induced impacts are the ensuing employee purchasing tied to both direct and indirect business wages. The IO model is a commonly used tool for regional economic impact analysis of recreational activities (e.g. Hutt et al. 2013). The deliverables will provide economic benefits in terms of jobs created, industrial output added, income and labor wage generated, and tax revenue contributed by WMA visitation. We will also estimate the user's WTP for hunting at WMAs, which will be multiplied by total car count data available from ODWC to calculate aggregate economic value to hunters for hunting in the WMA.

Expected Results or Benefits:
Results from this study will give ODWC a model describing desirable characteristics of ODWC-managed properties by its users, net economic value of accessing WMAs for recreational activities, and an economic impact analysis of WMAs on rural communities. The information about visitor use and economic impact of visitor uses on local economy can be used for future management priority. Creating a typology of user wants and needs will help better serve the WMAs and better inform the biologists on best management practices. Therefore, estimating recreational use, net economic value, and total economic impacts of WMAs in an integrated framework is a unique feature of this study.

Useful Life:
No capital improvements.

Geographic Location:
Grant activities will be conducted on campus at Oklahoma State University in Stillwater, OK.

Program Income:
Program income will not be generated from this project.

Equipment:
None.

Relationship with Other Grants:
None.

Timeline:

Time	Activities
January 2020 – June 2020	Hire MS student; design and pilot test survey questionnaire; submit protocols to OSU IRB for approval for use of human subjects
July 2020 – December 2020	Print and administer the survey; code survey data for analysis
January 2021 – December 2021	Analyze data and write final report.

Environmental Compliance:
See attached Section 7 & NEPA checklist.

References:

Dillman, D.A., Smyth, J.D. and Christian, L.M., 2014. Internet, phone, mail, and mixed-mode surveys: the tailored design method. John Wiley & Sons.

Hussain, A., Munn, I.A., Edwards, S.L. and Hunt, K., 2016. Economic valuation of hunter access on Mississippi Wildlife Management Areas: discrete-count data modeling. Forest Science, 62(5), pp.513-524.

Hutt, C.P., Hunt, K.M., Steffen, S.F., Grado, S.C. and Miranda, L.E., 2013. Economic values and regional economic impacts of recreational fisheries in Mississippi reservoirs. North American Journal of Fisheries Management, 33(1), pp.44-55.

International Association of Fish and Wildlife Agencies. 2002. Economic importance of hunting in America. Washington D.C.