Attachment C

PROJECT PROPOSAL

Division of Wildlife Management

Section:	**Surveys and Research**
Project Title:	**Turkey Gobbling Chronology**
Period Covered:	**October 1st, 2015 – December 31st, 2016**
Project Tenure:	**October 1st, 2015 – December 31st, 2016**
Principal Investigator(s):	**Chris Kreh – Upland Game Bird Biologist**
Participant(s):	**Chris Kreh – Upland Game Bird Biologist** **District Wildlife Biologists and other WMD and ELM Staff**
Prepared By:	**Chris Kreh – Upland Game Bird Biologist**
Date:	**October 7th, 2015**

INTRODUCTION

Turkeys are an infinitely valuable public trust resource in North Carolina. They are beloved by hunters and non-hunters alike. In recent years more than 60,000 hunters pursue turkeys each spring and annually harvest more than 15,000 birds. The NCWRC seeks to emphasize spring gobbler hunting, allow the population to grow in numbers and distribution, and to satisfy turkey hunters to the extent possible.

The NCWRC's regulatory management of wild turkeys in NC takes into account many factors including turkey ecology, hunter density, turkey population density, habitat and landscape attributes, tradition, and many others. Principal among these factors is the need for an understanding of turkey reproductive ecology here in the state. There are several facets to

reproductive ecology: gobbling activity, egg laying, incubation, nest predation, nest success rates, and others. Gobbling activity, and patterns of gobbling activity through the spring, attracts the interest and attention of turkey hunters. Gobbling activity, the timing of the spring turkey season, hunter success, and hunter satisfaction are all intertwined. As such, an understanding of gobbling chronology is paramount to successful turkey management.

Rigorously and scientifically collected data about the chronology of gobbling activity in North Carolina are lacking. Furthermore, the chronology of gobbling activity may vary across the state. It is generally recognized that the gobbling activity varies considerably with respect to latitude in North America, with gobbling activity occurring earlier in southern latitudes. In some cases, peak gobbling activity may vary by as much as two weeks within individual states (Palumbo 2010). Gobbling activity is generally thought to peak at two times during spring. Peaks are expected to occur before (prior to hens being receptive to breeding) and after (when hens are incubating nests) the primary breeding period. However, this pattern, and presumably other aspects of reproductive behavior, may not always occur (Miller et al. 1997).

Therefore, we need reproductive ecology data, specific to North Carolina, to make better informed regulatory decisions about turkey management. Specifically, this project will serve to identify patterns in gobbling activity in two parts of North Carolina while also assessing methodology/equipment to learn how to efficiently identify patterns of gobbling activity in all parts of North Carolina in future years (Rempel et al. 2013). The study will be conducted in two parts of the state (extreme southeast and extreme northwest) where factors thought to influence timing of gobbling are most different.

OBJECTIVES

This project has three specific objectives:

1. Determine the best methods for using acoustic recorders to research gobbling chronology in North Carolina

2. Use acoustic recorders to collect baseline gobbling chronology data in southeastern North Carolina.

3. Use acoustic recorders to collect baseline gobbling chronology data in the mountains of northwestern North Carolina

METHODS

Project Oversight:

Chris Kreh will oversee the project and communicate with field staff regarding programming and use of acoustic recorders, study sites selections, testing recorders in a variety of situations and other project details, as well as provide field staff with the required equipment and supplies.

Field Procedures

We intend to purchase and deploy 50 acoustic recorders (Model SM3 from Wildlife Acoustics). Twenty-five recorders will be used in southeastern North Carolina and 25 in northwestern North Carolina. Recorders will be placed in fixed locations and will record audio data (1 hour/day) from March 1 through May 31 of 2016. To the extent possible, recorders will be placed in areas where turkeys are either not hunted or where hunting and harvest pressure is very light. Placement will involve a variety of different habitat and landscape scenarios (ridgetop/slope; open field/thick forest; pine/hardwood forests; etc.) so that we can understand the utility of these units in North Carolina. In addition to initial set-up and final take-down, each recording unit will need to be visited every four weeks to replace batteries and download data.

In total, these 50 units will record approximately 4,600 hours of data. Based on conversations with other researchers we hope that this may record 5,000 or more gobbles. We estimate that it will take approximately 250 man-days of effort to analyze and summarize these data and we plan to hire temporary help from May – December of 2016 to accomplish this.

BUDGET

Total project expenses are estimated at $174,446.5 and 480 man-days as itemized below. All expenses will be coded to W66-1151 XXXX 0000. This activity code will be specific to this gobbling chronology project.

Gobbling Chronology Study 2015 - 2016				
Item	**Amount Needed**	**Unit Cost**	**Total Cost**	**Notes**
Acoustic recorders	50	$900	$45,000	Model SM3 from Wildlife Acoustics
Security boxes/locks/cables	50	$225	$11,250	
SD cards	200	$25	$5,000	Need minimum of 10 GB /recorder/month for data storage. Need multiple cards per unit for switching out mid-season
D-cell batteries	600	$1 each	$600	Need 4 batteries per recorder per month
AA batteries	100	$0.50	$50	
Diagnostic Software	3	$500	$1,500	
Manpower -- training and project coordination	50 man-days	$200/man-day	$10,000	
Manpower -- locating properties and putting up recorders	50 man-days	$200/man-day	$10,000	Approximatley 1 man-day/recorder
Manpower-- in-season checks, data retrieval, and removing units	75 man-days	$200/man-day	$15,000	Approximately 1.5 man-day/recorder total. Will need to visit recorders twice during season and final retrieval after 3 months
Manpower - data analysis/reporting	250 man-days	$128/man-day	$32,160	Preliminary startup will require considerable effort (approximately 20 man-days) and then expect to process approximately 20 hours of recording time per man-day at best.
Manpower - experimental testing/field situations	50 man-days	$200/man-day	$10,000	
Mileage -- setup, maintenance, retrieval of recorders	5000 miles	$0.46/mile	$2,300	Approximately 100 mile/recorder
Travel Expenses -- meals/lodging	5 days	$105	$550	
Indirect charges			$31,037	
		Total	**$174,446.50**	

EXPECTED BENEFITS

Results from this project will provide a better understanding of the chronology of gobbling activity in North Carolina. It will provide baseline information about gobbling activity in two parts of the state between which the chronology may differ. It will also determine the best methodology for identifying patterns in gobbling chronology in other parts of the state in future years. The results of this study in combination with information obtained from other studies (on other reproductive parameters) should provide information that enables seasons to be best aligned to both maximize reproduction and gobbler harvest.

This project will help achieve NCWRC strategic goal 3: conserve and enhance the abundance and diversity of the fish and wildlife resources of North Carolina, strategic objective 3.2: emphasize best available science in the application of fish and wildlife resource programs, and strategic objective 3.4: Evaluate and improve the effectiveness of regulatory programs

designed to promote wildlife conservation. The project will also help achieve several strategic objectives within the Wildlife Management Division's goal 2**: e**xpand scientific knowledge and understanding of habitats, communities, wildlife species, and the human aspects of wildlife conservation.

LITERATURE CITED.

Miller, D. A., G. A. Hurst, and B. D. Leopold. 1997. Chronology of wild turkey nesting, gobbling, and hunting in Mississippi. Journal of Wildlife Management 61:840-845

Palumbo, M. D. 2010. Influence of latitudinal and climatic variation, and field observations, on spring gobbling phenology of wild turkey in Mississippi. Thesis, Mississippi State University, Starkville, MS.

Rempel, R. S., C. M. Francis, J. N. Robinson, and M. Campbell. 2013. Comparison of audio recording system performance for detecting and monitoring songbirds. Journal of Field Ornithology. 84(1):86-97