PROJECT STATEMENT

STATE: **DELAWARE** GRANT: **W38R-10**

GRANT TITLE: **WILDIFE INVESTIGATIONS – WILD TURKEY**

JOB SCHEDULE: **OCTOBER 1, 2009 – SEPTEMBER 30, 2010**

STATE: Delaware

GRANT NUMBER AND TITLE:

W 38R – Wildlife Investigations: Wild Turkey

OBJECTIVE:

To restore and maintain wild turkey populations in all suitable habitat while maximizing recreational use of this resource.

JOB NUMBER AND TITLE:

Job 1. Wild Turkey Harvest Evaluation

JOB OBJECTIVE:

To monitor the annual wild turkey harvest and associated hunter effort and collect biological data from harvested birds.

ACTIVITY:

Delaware's 2009 spring turkey hunting season was 18 days long, running from 11 April to 1 May 2009. Private land hunters were allowed to hunt all 18 days of the season; public land hunters were selected through a preseason lottery to hunt one of three season segments, each six days long. Mandatory check stations were set up to collect biological information from all harvested birds.

TARGET DATE:

September 30, 2010

STATUS:

On schedule - per approved extension

REMARKS:

Delaware's 2009 spring turkey hunting season was 18 days long; running from April 11 to May 1. Private land hunters could hunt during the entire 18 day period; public land hunters were selected through a preseason lottery to hunt one of three, 6-day seasons during the same 18-day period. These seasons ran from Saturday through the following Friday (no Sunday hunting). Mandatory check stations were set up to collect biological information from all harvested birds.

In 2009, a new state record of 312 birds were taken, up 25% from the 2008 harvest of 249 birds, the previous state harvest record (Figure 1). Thirty-one turkeys were taken on public lands, most notably at Redden State Forest (n=9) and Norman G. Wilder WA (n=7) (Table 1). For the purposes of harvest reporting, Delaware is divided into 17 turkey harvest management zones (Figure 2). Reported harvest on both public and private lands was highest in zone 6, which accounted for 16% of the total harvest (Figure 3). Birds were harvested in all zones except for zone 1, which is characterized by mostly suburban, urban and industrial development, including the cities of Wilmington and Newark. Sussex County (zones 9-17) accounted for 53% of the total harvest, followed by Kent County (44%, zones 4-8), and New Castle County (3%, zones 1-3). This distribution among counties has remained consistent for the last several seasons. Fifty percent of the reported harvest occurred during first week of the season (Figure 4). Weeks two and three produced the remaining 27% and 23% of the reported harvest, respectively (Figure 4). This temporal harvest has also been relatively consistent among seasons. Adult gobblers comprised 66% of the male harvest, up from 54% in 2008. The average live-weight of adult gobblers was 19.9 lbs, with the largest bird weighing 26 lbs.

RECOMMENDATIONS:

This job should be continued, especially since the harvest of turkeys in Delaware continues to increase significantly with record harvests occurring in each of the last four seasons.

PREPARED BY:

Matthew DiBona
Gamebird biologist

REVIEWED BY:

Rob Hossler
Program Manager – Game Species

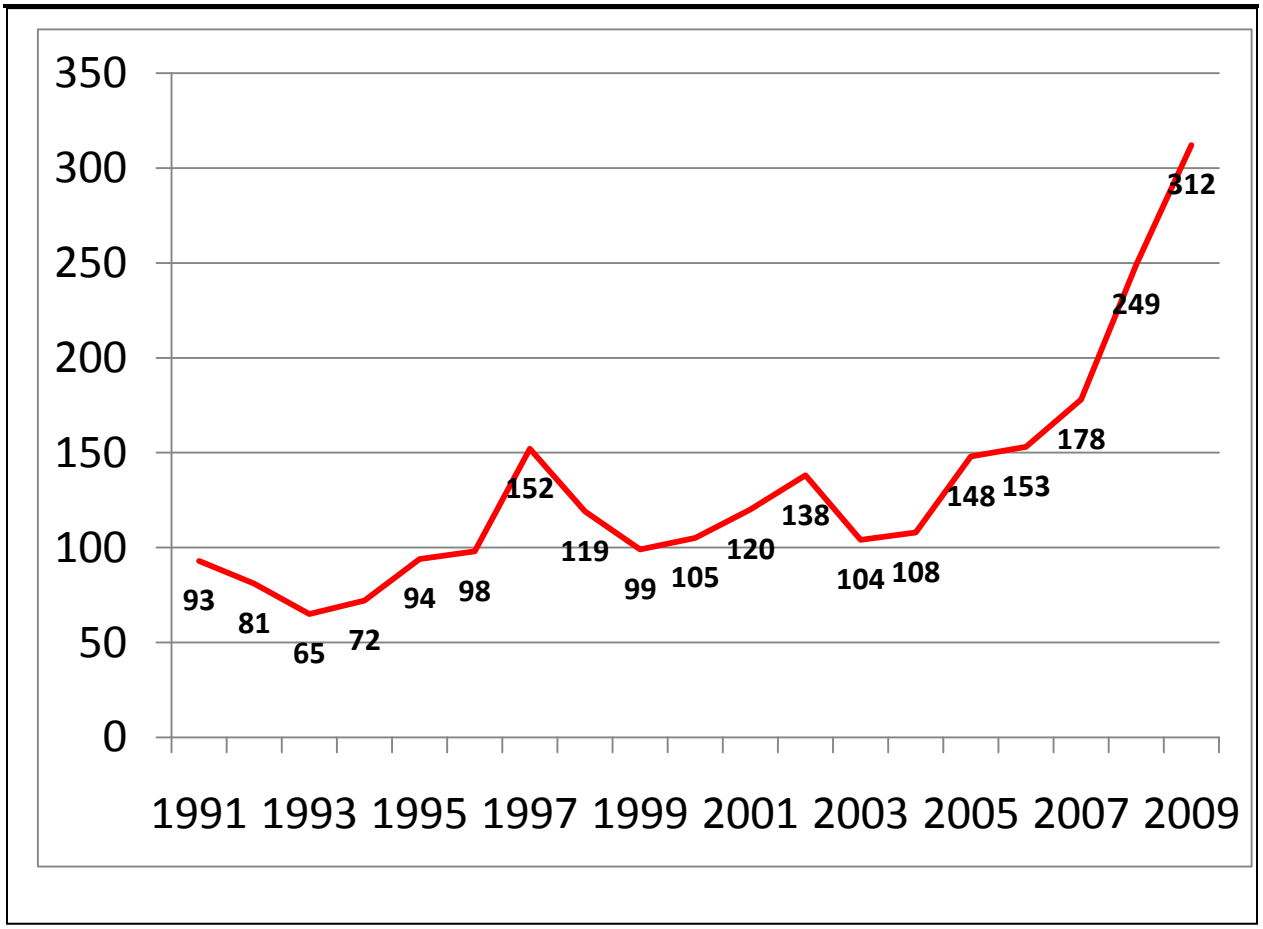

Figure 1. Annual harvest of wild turkeys in Delaware.

Table 1. Harvest distribution among public lands hunted during the 2009 Delaware spring turkey season.

Area	Harvest
Assawoman WA	0
Blackbird Reserve	3
Blackbird SF	1
Blackiston WA	1
Cedar Swamp WA	0
Little Creek WA	3
Marshy Hope WA	0
Midlands WA	1
Milford Neck WA	1
Nanticoke WA	1
Norman G. Wilder WA	7
Old Furnace WA	1
Prime Hook WA	0
Redden SF	9
Taber SF	1
Ted Harvey CA/Logan Lane Tract	0
Ted Harvey CA/Buckaloo Tract	0
Urban/Fortney Tracts	1
Woodland Beach WA	1
Total	31

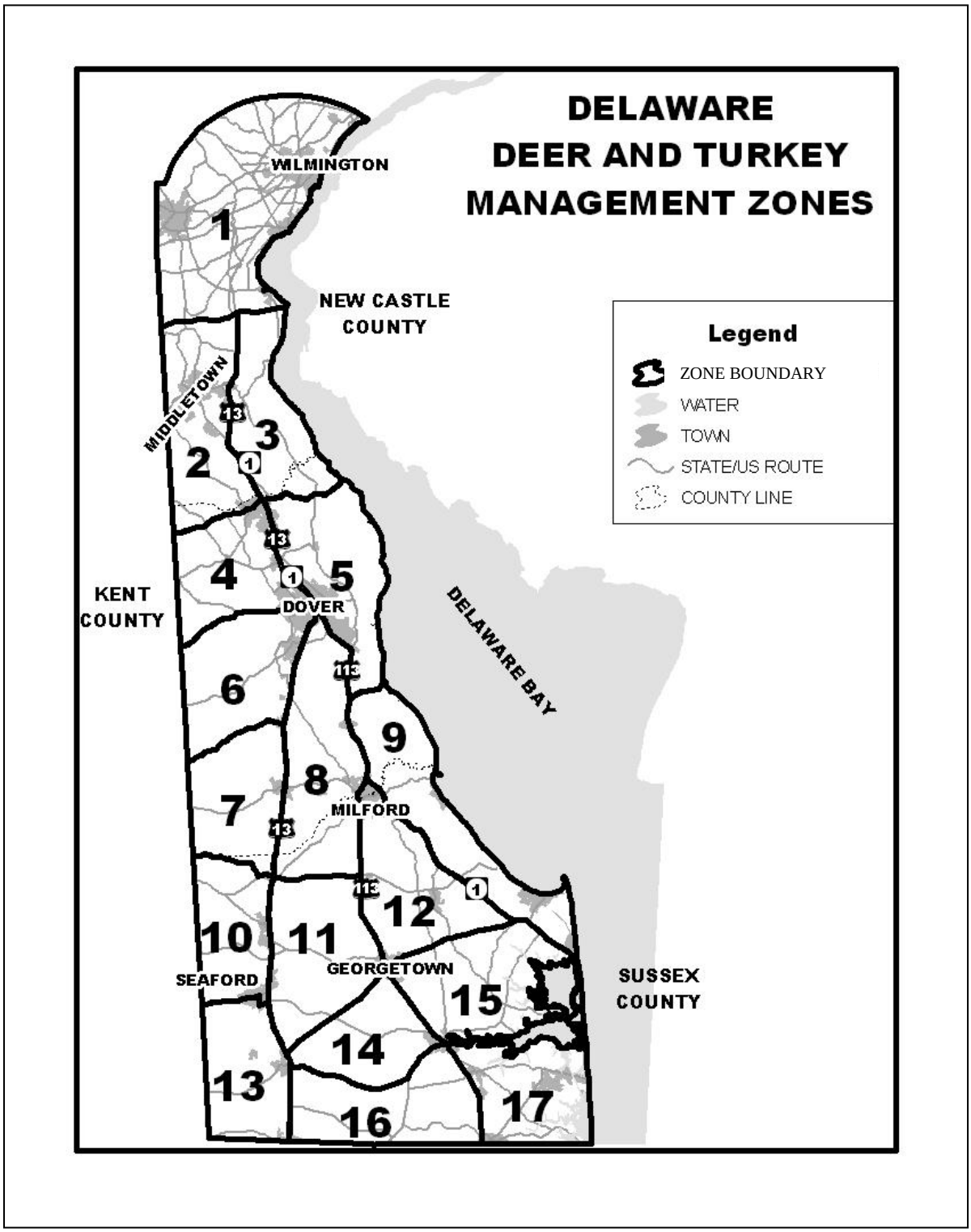

Figure 2. Delaware turkey harvest management zones.

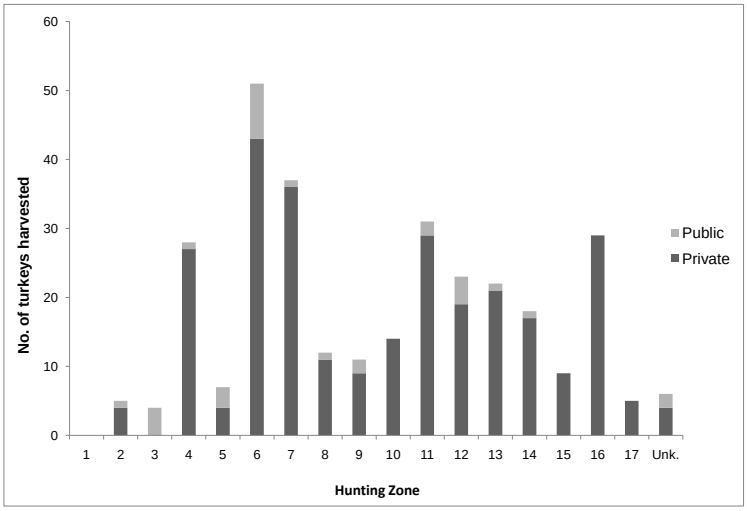

Figure 3. Spring 2009 Delaware turkey harvest on public and private lands by hunting zone.

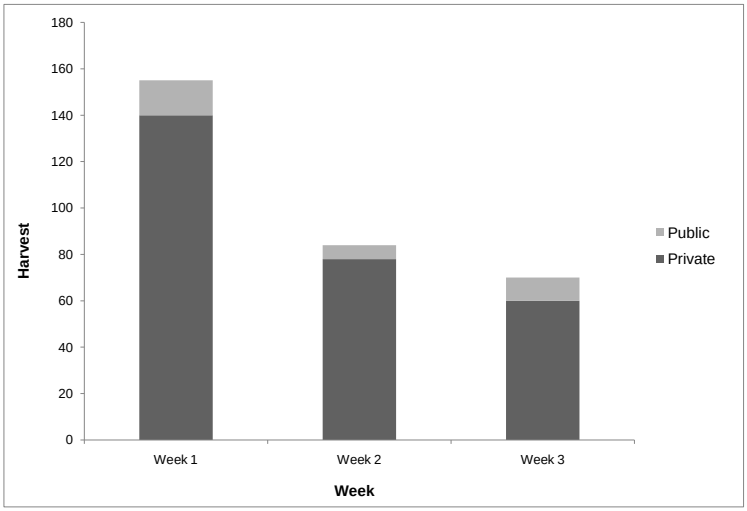

Figure 4. Spring 2009 turkey harvest by week on public and private lands.

STATE: Delaware

GRANT NUMBER AND TITLE:

W 38R - Wildlife Investigations: Wild Turkey

OBJECTIVE:

To restore and maintain wild turkey populations in all suitable habitat while maximizing recreational use of this resource.

JOB NUMBER AND TITLE:

Job 2. Acquisition and Release of Wild Turkeys

JOB OBJECTIVE:

To locate suitable release sites for wild turkeys in Delaware and to acquire and release a minimum of 15 birds at each location.

ACTIVITY:

No activity

TARGET DATE:

September 30, 2010

STATUS:

N/A

REMARKS:

None

RECOMMENDATIONS:

None

PREPARED BY:

Matthew DiBona, Gamebird Biologist

STATE: Delaware

GRANT NUMBER AND TITLE:

W 38R – Wildlife Investigations: Wild Turkey

OBJECTIVE:

To restore and maintain wild turkey populations in all suitable habitat while maximizing recreational use of this resource.

JOB NUMBER AND TITLE:

Job 3. Wild turkey abundance, distribution, reproductive success and habitat use.

JOB OBJECTIVE:

To evaluate wild turkey distribution, flock sizes, brood numbers and sizes and general habitat use.

ACTIVITY:

No Activity

TARGET DATE:

September 30, 2010

STATUS:

No activity

REMARKS:

None

RECOMMENDATIONS:

None

PREPARED BY:

Matthew DiBona, Gamebird Biologist

STATE: Delaware

GRANT NUMBER AND TITLE:

W 38R – Wildlife Investigations: Wild Turkey

OBJECTIVE:

To restore and maintain wild turkey populations in all suitable habitat while maximizing recreational use of this resource.

JOB NUMBER AND TITLE:

Job 4. Wild turkey abundance, distribution, reproductive success and habitat use.

JOB OBJECTIVE:

To evaluate the reproductive ecology, habitat use, and survival of wild turkeys in Delaware

ACTIVITY:

The Delaware Division of Fish and Wildlife contracted the University of Delaware to conduct a hen reproductive ecology study in Sussex County, DE (Attachment 1).

TARGET DATE:

September 30, 2010

STATUS:

On schedule per approved extension

REMARKS:

Under the proposed schedule of activities, turkey live capture activities were slated to commence in January 2009. However due to contract t issues related to field housing, no fieldwork was conducted during Winter 2009. A revised contract between the University of Delaware and the Division was finalized in Summer 2009 with an anticipated revised project start date of December 2009. Project completion is now scheduled for July 2012.

In preparation, radio transmitters and associated trapping supplies for the first year of the study have been purchased and field housing in close proximity to the study area has been secured. A technician was hired by the University of Delaware to inventory and refurbish existing

equipment, as necessary. In addition, two months were spent investigating the study area for potential trapping locations and making contacts with local landowners for possible trapping access.

RECOMMENDATIONS:

This job should be continued

PREPARED BY:

Matthew DiBona
Gamebird Biologist

REVIEWED BY:

Rob Hossler
Program Manager – Game Species

ATTACHMENT 1

REPRODUCTIVE ECOLOGY OF THE EASTERN WILD TURKEY IN SUSSEX COUNTY, DELAWARE

Principal Investigator: Dr. Jacob L. Bowman, University of Delaware

Problem Statement

Eastern wild turkey (*Meleagris gallopavo silvestris*) populations were decimated by over harvest and habitat destruction by the early 1900s. State wildlife agencies, often in cooperation with the National Wildlife Turkey Federation, used trapping and translocation of wild birds to repatriate wild turkeys over most of their native range. However, agricultural fields often with little forest habitat dominate the Delmarva Peninsula's landscape, so repatriation of wild turkeys in these areas has been more difficult. Success of repatriation efforts has varied across the Peninsula. Previous research in other states has demonstrated that adult hen survival, poult survival, and nest success are the main factors affecting population viability of wild turkeys. Currently, no information exists for these population parameters on the Delmarva Peninsula. Therefore, to understand repatriation success, estimates of these population parameters are needed. These data will allow managers to more effectively manage wild turkeys.

Objectives

Turkey movements and nests will be monitored to determine reproductive ecology of wild turkeys on the Delmarva Peninsula, specifically Sussex County, Delaware. This research will elucidate the impact of reproductive parameters on population viability.

Specific objectives will be:

1. Determine nesting success and clutch size for wild turkeys

2. Determine adult hen survival for wild turkeys

3. Determine poult survival for wild turkeys

Methods

We will capture turkeys using rocket nets on Redden State Forest and adjacent private lands. Each captured turkey will be tagged with 2 metal leg bands for permanent identification. We will capture and fit 40 adult wild turkey hens with backpack radio transmitters.

During the nesting season, we will locate each turkey 1-2 times per day to determine nesting initiation. We will locate nesting turkeys daily until nest completion or abandonment. Outside of the nesting season, we will locate turkeys 4-5/month.

To investigate microhabitat selection of nesting sites, we will sample vegetation at each nest site and a random location near the nest site. Vegetation variables of interest will include horizontal density, basal area, vegetation type, and canopy cover. We will compare successful and unsuccessful nests to determine if habitat structure can be altered to improve nesting success.

Using electronically recorded "lost poult" calls and flush counts, we will estimate poult survival at 30, 60, and 90 days post hatching. We will compare these survival estimates to previous studies on eastern wild turkeys to determine if the estimates are within the normal range of variation.

To determine if adult hen survival rates fall within the variation observed for other agricultural landscapes, we will monitor adult hen survival. We will use radio-telemetry to document the causes and timing of mortality events. Additionally, we will estimate survival rates using a staggered entry modification of the Kaplan-Meier procedure and compare survival rates among seasons and years using contrasts. We will also estimate cause-specific mortality rates and compare these rates among seasons and years.

Outcomes/Deliverables

This research will provide baseline information about the ecology of wild turkeys on the Delmarva Peninsula. Reproductive ecology data will provide a better understanding of the viability of wild turkey populations in this fragmented landscape. Additionally, this information will be valuable in recommending management actions for wild turkey flocks on the Delmarva Peninsula.

Justification

Management decisions should always be based on the best available scientific data. Currently, reproductive ecology data for wild turkeys on the Delmarva Peninsula are lacking. Additionally, interest for increasing the wild turkey population is high, but repatriated flocks have exhibited limited population growth. In order to effectively manage wild turkeys in this landscape, research elucidating their reproductive ecology is necessary.

Benefits

The Delaware Division of Wildlife lacks data to determine the factors limiting repatriated flocks of wild turkeys. This research will elucidate the impact of reproductive parameters on population growth and recommend management strategies that will be most effective for increasing wild turkey abundance on the Delmarva Peninsula.

Time Frame (Revised)

Year 1 (-2010)
- Capture activities (December 2009 – March)
- Monitoring nesting (late-March – June)
- Radio telemetry monitoring of turkeys (January – December)

Year 2 (20110)
- Capture activities (December 2010 – March)
- Monitoring nesting (late-March – June)
- Radio telemetry monitoring of turkeys (January – December)

Year 3 (2012)
- Data analysis and reporting (January – July)

GRANT NUMBER AND TITLE:

W 38R – Wildlife Investigations: Wild Turkey

OBJECTIVE:

To restore and maintain wild turkey populations in all suitable habitat while maximizing recreational use of this resource.

JOB NUMBER AND TITLE:

Job 5. Wild Turkey Genetics

JOB OBJECTIVE:

To evaluate the genetic diversity of the wild turkey population in Delaware.

ACTIVITY:

The Division of Fish and Wildlife is providing financial support to cover lab materials and sampling supplies for a genetic diversity study of wild turkeys in Delaware being conducted by Delaware State University (Attachment 2)

TARGET DATE:

September 30, 2010

STATUS:

On schedule - per approved extension

REMARKS:

A Delaware State University graduate student was able to collect 46 genetic samples from Division-operated check stations in 2008 and 77 samples in 2009. She has also received genetic samples from cooperating state agencies in the northeast to conduct comparative genetic analyses between Delaware turkeys and birds from source stock states that originally donated turkeys to Delaware during restoration activities in the 1980s and 1990s.

Starke is currently working on completing DNA extraction, PCR, and gel electrophoresis of the genetic samples. Expected completion of sample processing is Fall 2009. Tentative analyses will include spatial and temporal comparisons of genetic structure and diversity of the Delaware

turkey population, including comparisons among samples collected in each county and by year. Samples will also be tested for hybridization with domestic turkey stock. Source stock comparisons will examine genetic structure and diversity between source states and the Delaware turkey population. Expected project completion is spring 2010.

RECOMMENDATIONS:

This job should be continued

PREPARED BY:

Matthew DiBona
Gamebird Biologist

REVIEWED BY:

Rob Hossler
Program Manager – Game Species

ATTACHMENT 2

Genetic Structure of Reintroduced Wild Turkeys (*Meleagris gallopavo*) in Delaware

Christie Starke
Delaware State University
Department of Agriculture, Natural Resources and Related Sciences

BACKGROUND

In the early 1800s, wild turkeys (*Meleagris gallopavo*) were extirpated from the state of Delaware due to unregulated hunting and habitat change. In 1984, DNREC began a restoration project and introduced turkeys back into Delaware. Thirty-four turkeys were donated from New Jersey, Pennsylvania, and Vermont and were released east of Milford, near Thompsonville, and in south central Sussex County (Cypress Swamp) (Reynolds 2003). Since that time, birds have been received from Virginia, South Carolina, and New York and released at sixteen different locations throughout the state.

When there is a reintroduction of a species, like the wild turkey, it is necessary to understand the effects on the genetic structure. Populations that have a large amount of genetic diversity have a better chance of survival (Latch et al. 2002). When birds are brought in from different states, the genetic diversity (as measured by heterozygosity) may be very different. If the birds had a low heterozygosity to start with, the chances of developing a high diversity are small. A bird population with higher heterzygosity will have a better chance of surviving into the future (Purdue University 2002). There is very little research that looks at the genetic consequences of reintroduction, especially in Delaware. This project provides a unique opportunity for research on wild turkeys in Delaware. The outcome of this research will help managers understand the current population and will help with decision making about future releases.

OBJECTIVES

1. Determine heterozygosity of the wild turkey population in Delaware.
2. Determine which county has the highest genetic diversity.
3. Determine if the origin of the birds makes a difference on genetic structure; if so, which state(s) the birds in the future should come from.
4. Determine if there is any hybridization with domestic turkeys.

METHODS

Sampling

The first sampling will occur from April 12, 2008 until May 2, 2008 at various checking stations throughout the state; at least one in each county. The second sampling will occur during the 2009 turkey season. The goal for a sample size is a total of 50-100 birds. Blood samples will be taken from hunter-harvested birds and frozen in a buffer until testing. Measurements such as leg length, wing length, beak length, and weight, will also be taken on each bird. Blood samples

will also be taken from domestic turkeys and pheasant. Domestic turkey and pheasant samples will be taken from local growers.

Study Species

The wild turkey (*Meleagris gallopavo*) will be the focal species. The domestic turkey will be used as a comparison and the pheasant (*Phasianus colchicus*) will be used as an out-group.

Lab Methods

Gel Electrophoresis procedures will be used to separate DNA and DNA fingerprinting and gel electrophoresis procedures will be use to analyze the DNA.

LITERATURE CITED

Latch, E.K., E.J. Smith, and O.E. Rhodes. 2002. Isolation and characterization of microsatellite loci in wild and domestic turkeys (*Meleagris gallopavo*). Molecular Ecology Notes 2:176-178.

Purdue University. 2002. Genetic diversity could be biggest danger to wild turkeys. Science Daily. http://www.sciencedaily.com/releases/2002/11/021126203850.htm. Retrieved on March 25, 2008.

Reynolds, K. 2003. Peek-A-Boo I see turkeys; 4,000 wild turkeys since 1986, a restoration success story. Division of Fish and Wildlife News 33(330): 30-31.