

Michigan Department of Natural Resources Research Project Descriptions, 2011

Predator-Prey Project

The impact of predators on prey populations has been the subject of numerous scientific studies and has been debated at length by the public. There is agreement in the scientific community that the relationship between predators and prey is very complex and broad descriptive statements cannot be made. In some cases predators limit prey populations and in other cases they do not. The relationship between predators and prey is influenced by a host of factors that can vary from place to place and over time. Factors that must be considered include the number of different prey species available, the number of different predators in the system, the relative density of predators and prey in the area, the response of predators and prey to changes in prey numbers, and the effects of weather and disease on predators and prey. Unfortunately, data from areas where predators prey predominately on white-tailed deer are limited.

White-tailed deer are an important species in Michigan providing many values, including ecological, social and economic. Most generally, factors that can limit deer numbers include food supply, winter cover, disease, predation, weather, and hunter harvest. Deer numbers change with changes in these limiting factors. Considerable research has been conducted demonstrating the effects of winter severity on white-tailed deer condition and survival and the importance of food supply and cover, particularly during winter, has been documented. While the role of predation on white-tailed deer survival has received some attention, many questions remain. A better understanding of the possible impact of predators on deer population dynamics requires information on the role of predation on white-tailed deer fawn survival and the extent to which predation is additive or compensatory with other causes of death. The predator-prey system is complex and it will be important to simultaneously address the roles of various limiting factors (e.g., predators, winter weather).

To assess the role of predation on white-tailed deer fawns we are capturing and radio-collaring newborn fawns to estimate their survival and determine the causes of mortality. We are simultaneously assessing the effects of predation and winter severity and indirectly evaluating the influence of habitat conditions on fawn recruitment.

An informative perspective from which to judge the effect of predation on deer population dynamics is to assess the relationship between proportion of deer killed by predators and annual survival rate of deer. If higher levels of predation reduce deer survival then predation is additive to other sources of mortality and might influence deer numbers. In contrast, if deer survival remains constant despite varying levels of predation, then predation simply substitutes for other sources of mortality. To adequately assess this relationship we will need to maintain a sample of at least 300 radio-collared deer for five years. Currently we are on track to meet that goal.

Partners: Safari Club International-MIC, Safari Club International Foundation, Mississippi State University, Michigan Technological University

Time Line and Budget: Major equipment purchases for this project have been made, deer trapping started during the winter of 2009 and 2010. Predator trapping occurred during May, June and July 2009 and 2010. We are accumulating an extensive dataset on predation on deer, with an emphasis on fawns and are evaluating impacts of wolves, bear, coyotes, and bobcats. Expendable supplies (e.g., VHS collars, GPS collars, vaginal implant transmitters) are required each year. This project is anticipated to be conducted in three snowfall zones in the UP with a total duration of approximately ten years. Total project costs could exceed \$3,000,000.

Gray Wolf Population Project

The gray wolf has returned to its former range in the Upper Peninsula of Michigan (UP). Wolf population growth and range expansion have been monitored since 1989. In winter 2010, we estimated there were at least 580 wolves present in the UP. Wolves have also been documented in the Northern Lower Peninsula using trail cameras as late as July 2009, and a pair produced pups in Cheboygan county in the spring of 2010. Two of those pups were captured and radio-collared in October 2010. As the wolf population increased, a program of research was developed to aid in monitoring their recovery and management. Over 200 wolves have been captured and radio-collared providing important information on distribution, movements, and pack and territory size. This information is critical to our annual population census. Population estimates are becoming increasingly difficult as the current technique relies on identification of individuals within discrete packs. Important work has been done on evaluating alternative approaches to estimating population size and a new sampling procedure which will save us time and money has been implemented. We have also developed a model of wolf habitat use that predicts the amount and location of suitable habitat.

Despite legal challenges, the US Fish and Wildlife Service continues work toward removing the wolf from the Federal list of threatened and endangered species. We strongly support delisting and this project puts Michigan in an excellent position to defend our science-based management programs in the future.

Partners: Safari Club International-MIC, Michigan Technological University

Time Line and Budget: This project started in 1999 and will continue for at least five years following Federal delisting. Delisting occurred in 2008, yet following legal actions, the wolf was re-listed as endangered by the US Fish and Wildlife Service, so monitoring at high levels continues. Total project costs are greater than \$800,000.

Southern Michigan Black Bear Project:

Black bears are an important species in Michigan providing many values, including ecological, social and economic. Bear populations are increasing in Michigan and more dispersing bears are entering agricultural regions of southern Michigan, resulting in increased bear-vehicle collisions, and increased conflicts with agriculturalists and the general public. Through surveys, we know that humans in southern Michigan are less

tolerant of bears than northern Michigan residents and are more likely to seek action from the Department when encountering bears. However, seventy-percent of residents in southern Michigan desired at least some level of bears present.

Managing bears involves balancing healthy bear populations that provide both viewing and hunting opportunities for the public against excessive human-bear conflicts. Management of bears in southern Michigan requires information on the ecology and movement patterns of bears outside of the traditional northern range. These factors are likely a function of fragmented agricultural habitats and increased access to human related foods and agricultural crops. Unfortunately there is very little scientific information on bear dispersal, density, and habitat influences in the southern range that the DNR can use to develop a proactive management strategy for bears in southern Michigan.

We propose to outfit 6 bears during each of 2 years (12 bears total) with GPS tracking collars to characterize the movements and habitat use of bears in southern Michigan (generally south of a line from Muskegon to Bay City). We will trap bears in areas of frequent reports of sightings during summer. Yearlings denned with their radio-collared mothers will be outfitted with GPS collars programmed to begin collecting fixes upon emergence in the spring. Collars will be programmed to record regular fixes until denning the following winter. Collars (and stored data) will be recovered from bears once they enter hibernation. In addition to GPS electronics, each collar will carry a conventional VHF beacon to assist in the location of winter den sites and to provide verification that the animal is alive and active between collar attachment and retrieval.

Data collected from GPS collars will provide important information for formulating a management strategy for southern Michigan bears including:

1. Quantifying use of the landscape (home ranges, foraging patterns, dispersal distances) by bears
2. An estimate of the distribution of denning dates
3. An estimate of litter sizes and cub survival
4. Identification of key characteristics of travel corridors used by bears
5. Verification of predictive spatial model(s)
6. An estimation of bear distribution.

Partners: Safari Club International-MIC, University of Wisconsin-Madison

Timeline and Budget: We had anticipated starting this project in early 2009, yet it was delayed due to lack of funding. We initiated the project in the spring of 2010 by collaring one female (with cubs) and one male in dens in Oceana County. This is a multi-state effort in collaboration with Wisconsin, a state that is also experiencing a southward expansion of their bear population. The fiscal year 2011 budget is \$32,000, and the project will continue for approximately five years.

Diving Duck Project

The Great Lakes and associated wetlands contribute to the importance of Michigan as a concentration area for diving ducks during migrations. Fall diving duck concentrations in Michigan support a long tradition of diving duck hunting. Michigan also contains important spring migration areas for diving ducks where the birds feed to improve body condition prior to migrating to breeding areas. Lake St. Clair, Detroit River and western Lake Erie provide important habitats for migrating and wintering diving ducks and this area is considered a site of continental significance to waterfowl. The area supports a diversity of waterfowl and wetland bird species, with canvasbacks, lesser and greater scaup, and redheads being prominent during spring and fall migrations. Declining use of this area by canvasbacks and a continental decline of scaup linked to inadequate food resources on spring migration areas highlight the need to better understand factors contributing to the distribution and abundance of diving ducks in Michigan.

A number of factors may be linked to changes in distribution of diving ducks in Michigan including: increased human disturbance, a longer ice-free period, rapid expansion and then decline of exotic zebra and quagga mussels, and changes in water clarity, chemistry, and submerged aquatic plants associated with exotic mussel invasions. There is also concern about impacts to diving ducks of proposed expansion of near-shore and onshore wind energy development in the Great Lakes. Our study involves analysis of existing information available from historic aerial diving duck surveys, testing new methods to quantify distribution and abundance of diving ducks via aerial surveys, and developing models of factors contributing to observed diving duck distributions so future management and policy decisions can benefit from improved understanding of diving ducks during migration.

We are conducting fall and spring diving duck surveys and testing distance sampling methods as a means to estimate abundance and to model the distribution of birds. We are testing a number of assumptions involved with these surveys and we are working with Michigan State Police Aviation Section to incorporate a nocturnal distribution survey using forward looking infrared video to identify preferred diving duck feeding areas.

Partners: Upper Mississippi and Great Lakes Joint Venture, Michigan State Police Aviation Section, Safari Club International-MIC, Michigan State University, Winous Point Marsh Conservancy

Time Line and Budget: This project started in 2010 and will continue for at least three years and we are hoping to expand the geographic scope of this study to include other important diving duck migration areas in the Great Lakes region. The current project budget is approximately \$65,000 per year.
