



Report to the Environmental Review Commission on Coyote Management
March 1, 2016



▣ North Carolina Wildlife Resources Commission ▣

Gordon Myers, Executive Director

March 1, 2016

Honorable Jimmy Dixon
N.C. House of Representatives
300 N. Salisbury Street, Room 416B
Raleigh, NC 27603-5925

Honorable Chuck McGrady
N.C. House of Representatives
300 N. Salisbury Street, Room 304
Raleigh, NC 27603-5925

Senator Trudy Wade
N.C. Senate
300 N. Salisbury Street, Room 521
Raleigh, NC 27603-5925

Honorables:

The 2015 General Assembly directed the North Carolina Wildlife Resources Commission (WRC) to establish a coyote management plan to address the impacts of coyotes in North Carolina. I am submitting this report to the Environmental Review Commission in fulfillment of the requirements of Section 4.35.(a) and Section 4.34.(a) of Session Law 2015-286 (H765). As directed in statute, this report provides initial findings and recommendations by the North Carolina Wildlife Resources Commission to address overpopulation of coyotes in North Carolina. This report also outlines the progress of the established pilot coyote management assistance program in Mitchell County.

If you have questions or need additional information, please contact me by phone at (919) 707-0151 or via email at gordon.myers@ncwildlife.org.

Respectfully,

Gordon Myers
Executive Director

Introduction

The Wildlife Resources Commission conserves North Carolina's wildlife resources and their habitats and provides programs and opportunities that allow hunters, anglers, boaters and other outdoor enthusiasts to enjoy wildlife-associated recreation. As outlined in our strategic plan, the commission will evaluate and improve the effectiveness of regulatory programs designed to promote wildlife conservation by establishing a comprehensive framework to ensure sustainable wildlife resources. By implementing wildlife management plans, we can attempt to address the impact of predators and other wildlife species.

The 2015 General Assembly directed the NCWRC to establish a coyote management plan to address the impacts of coyotes and the threats that coyotes pose to citizens, industries, and populations of native wildlife species within the State. The Wildlife Resources Commission was directed to report its findings and recommendations, including any proposed legislation to address overpopulation of coyotes, to the Environmental Review Commission by March 1, 2016.

In addition, the NCWRC was directed to establish a pilot coyote management assistance program in Mitchell County. In implementing the program, the Commission must document and assess private property damage associated with coyotes; evaluate effectiveness of different coyote control methodologies, including lethal removal; and evaluate potential for a scalable statewide coyote assistance program.

WRC was directed to submit an interim report on the progress of the pilot program to the Environmental Review Commission by March 1, 2016. A final report on the results of the pilot program, including any proposed legislation, shall be submitted to the Environmental Review Commission by January 1, 2017.

Legislation

SESSION LAW 2015-286 (HOUSE BILL 765)

SECTION 4.34.(a) The Wildlife Resources Commission shall establish a coyote management plan to address the impacts of coyotes in this State and the threats that coyotes pose to citizens, industries, and populations of native wildlife species within the State.

SECTION 4.34.(b) The Wildlife Resources Commission shall report its findings and recommendations, including any proposed legislation to address overpopulation of coyotes, to the Environmental Review Commission by March 1, 2016.

SECTION 4.35. (a) The Wildlife Resources Commission shall establish a pilot coyote management assistance program in Mitchell County. In implementing the program, the Commission shall document and assess private property damage associated with coyotes; evaluate effectiveness of different coyote control methodologies, including lethal removal; and evaluate potential for a scalable statewide coyote assistance program.

SECTION 4.35. (b) The Wildlife Resources Commission shall submit an interim report on the progress of the pilot program to the Environmental Review Commission by March 1, 2016. The Wildlife Resources Commission shall submit a final report on the results of the pilot program, including any proposed legislation, to the Environmental Review Commission by January 1, 2017.

Background

Coyote Description and Biology

Coyotes have pointed and erect ears, and long slender snouts. The tail is bushy and black-tipped and is usually carried pointing down. Their color is typically dark gray, and can range from blonde to black. Adults are typically the size of a medium-sized dog and average between 20 and 45 pounds although larger animals have been documented. In many parts of the U.S., including N.C., coyotes may be mistaken for dogs or wolves, and the existence of both dog-coyote hybrids and wolf-coyote hybrids can make identification difficult. Coyotes feed on a wide variety of food sources, depending on what is most readily available and easy to obtain. Coyote foods sources include fruit, berries, pet food left outside, small mammals (voles, rats, and mice), deer, carrion, rabbits, birds, snakes, frogs, insects, etc. Coyotes can also prey on livestock and domestic pets. Coyotes have an important ecological role in nature as an apex predator, maintaining prey species numbers at bay.

Coyotes typically mate for life and breeding occurs from January through early March. Pups are born in March and April and the typical litter size is six to eight pups. As a highly adaptable species, coyotes can increase the number of pups per litter when stressed, this is called compensatory reproduction and it usually happens when a high number of coyotes is removed from the landscape. This specific compensatory trait should be considered when implementing coyote management strategies. In areas where intense coyote harvest occurs, a temporary reduction in coyotes may occur, but this result may be short-lived because coyotes can respond by producing larger litters. Additionally, individuals born in other areas may disperse large distances in search of new home ranges, and replace removed dominant animals. Surprisingly, when as much as 60% of the coyote population is removed from an area, the population can recover within a year. Even if 90% of coyotes are removed, the population can recover in 5 years.

Family units usually begin to disperse by late November or December. Dispersal rates are high and dispersal distances can be extensive; records show that some coyotes in North Carolina have dispersed more than 200 miles in just a few months. Coyotes are territorial and actively defend their home ranges. These home ranges can vary between 1,000 and 16,000 acres depending on season, habitat, presence of other predators, and food availability. Coyote habitat ranges from agricultural fields to forested regions and suburban neighborhoods. Coyotes usually dig their own den, but they will sometimes enlarge an old animal hole or use a natural hole in a rocky ledge as a den. Dens are usually hidden from view and used by coyotes to birth their young and sleep.

When an individual coyote or family group leaves or is removed, new coyotes will usually move into the vacated territory. These territories frequently overlap with one or more transient coyotes that are searching for a mate or their own territory. The transient nature of the population makes estimating the number of coyotes in a particular area difficult, which, in turn, makes controlling coyote populations difficult. Coyotes are often wary of people and will avoid areas in which threats are perceived. In some cases coyotes can become acclimated to humans in the absence of threats, and in areas where unnatural food sources, such as pet food and garbage are readily available.

Coyote Distribution

Prior to the 1800s, coyotes occupied the prairies and grasslands of the Midwest. However, changes in habitat and predator prey dynamics have allowed the expansion of coyotes across the United States.

Extensive efforts have been devoted to controlling coyotes across the United States. Despite these extensive control attempts coyotes have continued to expand their range. The coyote is North America's widest ranging wild canid. A highly adaptable species, coyotes have thrived in a variety of landscapes, including urban environments.

The first reported sighting of a coyote in N.C. was in Gaston County in 1938. The first confirmed coyotes that were collected came from Johnston County (1955) and Wake County (1970). Prior to 1983, North Carolina had only sporadic instances of coyotes mostly on the coastal plain; these coyotes likely escaped from captivity or were released illegally for the purpose of hunting. The first coyotes believed to have naturally dispersed into North Carolina were detected in 1988 in the far western counties of the state. This natural range expansion from Tennessee, Georgia, and South Carolina likely occurred due to removal of other large predators (wolves and cougar) reducing competition, major landscape level habitat changes, including the creation of trails and roads, and an increase of novel food resources such as crops. By 2005, coyotes occurred in all 100 North Carolina counties.

Legal Status

Coyotes have no special protection in North Carolina and may be killed by any method that is not prohibited by federal, state, or local statutes. Currently there is no closed season for hunting coyotes in North Carolina. Electronic calls may be used and coyotes may be hunted at night, except on private lands in Beaufort, Dare, Hyde, Tyrrell and Washington counties. Coyote hunting in those counties is restricted to daytime only and requires a permit from the NCWRC. However, under authority of 15A NCAC 10B .0106 depredation permits may be issued by WRC for the taking of wildlife resources in circumstances of overabundance.

Trapping coyotes is allowed during any open furbearer trapping season and when any fox trapping season established by local law is open. Coyotes taken by trapping during these seasons may be sold to Controlled Fox Hunting Preserves, as established under GS 113-273(g). Further, any landowner wishing to control coyotes may receive a depredation permit from the NCWRC. There are no coyote bag limits of any kind (individual, daily, season, etc.) for trapping and hunting seasons. It is illegal to breed or import coyotes into North Carolina, as established under GS 113-294(o).

Commission Authority to Regulate Coyote Hunting – Coyotes are classified as wild animals (GS 113-129), but not game. Under this classification the Commission has the authority to set hunting seasons and bag limits (GS 113-291.2) and designate manner of taking, including the use of artificial lights and electronic calls (GS 113-291.1).

Commission Authority to Regulate Coyote Trapping – The Commission uses the same authority (GS 113-291.2) to set trapping seasons and bag limits as for hunting seasons. Trap types for wild animals are specified in GS 113-291.6. Trappers may trap coyotes under the authority of their trapping or hunting license.

Commission Authority to Issue Depredation Permits – The Commission has the authority (GS 113-274) to issue depredation permits to authorize the taking, destruction, transfer, removal, transplanting, or driving away of undesirable, harmful, predatory, excess, or surplus wildlife or wildlife resources. Livestock or poultry owners are issued a depredation permit for coyotes upon request. No depredation permit or any license is needed for the owner or lessee of property to take wildlife while committing depredations upon the property.

Coyote Harvest

In the 2014-2015 hunting season, NC hunters harvested an estimated 43,507 coyotes. While some hunters do specifically hunt for coyotes, many coyotes are killed incidentally by hunters that are pursuing other species such as deer. North Carolina trappers successfully trapped an estimated 7,611 coyotes during the 2014-15 trapping season.

Table 1. Statewide coyote harvest estimates from hunter and trapper harvest surveys of North Carolina license holders.			
Year*	Species	Estimated Statewide Hunter Harvest	Estimated Statewide Trapper Harvest
2005-06	Coyote	19,422	593
2006-07	Coyote	-	847
2007-08	Coyote	35,144	1,434
2008-09	Coyote	-	1,747
2009-10	Coyote	-	2,091
2010-11	Coyote	36,041	2,843
2011-12	Coyote	31,663	3,458
2012-13	Coyote	27,152	5,419
2013-14	Coyote	34,972	6,951
2014-15	Coyote	43,507	7,611
*Hunter harvest surveys were conducted intermittently prior to 2010.			

North Carolina Coyote Management Plan

As stated, Section 4.34(a) of Session Law 2015-286 (House Bill 765) stipulates that “[t]he Wildlife Resources Commission shall establish a coyote management plan to address the impacts of coyotes in this State and the threats that coyotes pose to citizens, industries, and populations of native wildlife species within the State.” Coyotes are now a statewide component of North Carolina’s fauna. While intensive management of coyotes on individual or groups of properties can be successful, statewide perspectives on coyote management must recognize the variability and persistence of coyotes across the state and must be flexible and adaptive. Critical tenants of successful coyote management must be collaboration, and implementation to satisfy the desires of citizens across a wide variety of circumstances. Coyote

population management to satisfy the desires of North Carolinians and managing situations to minimize negative human-coyote interactions must be our goals and, therefore, the foundation of a statewide management plan.

Developing a Statewide Coyote Management Plan

The development of a statewide management plan for any species is a complex undertaking that addresses biological, social, economic, and political aspects of species management. Using coyote management efforts previously undertaken by the NCWRC as a foundation, we will expand efforts through development of a statewide coyote management plan (Plan). Approaches to developing the Plan, and elements therein, will address the biological, social, economic, and political aspects of successful coyote management. Developing the Plan requires that we explore and understand the attitudes, opinions, and desires of our citizens regarding coyotes, that we compile other currently available information about coyotes, and that we meld these considerations into a plan that collectively addresses stated goals. It is important to understand the real and perceived economic impact of human-coyote interactions and the cost associated with implementing a coyote management plan to assess its economic viability. Development of multiple aspects of the Plan will progress simultaneously. In order to address the requirements of Section 4.34(a), the NCWRC has established a team to draft a North Carolina Coyote Management Plan (Plan). The Plan will include:

- Evaluation of all available biological information on coyotes in North Carolina;
- Identification of knowledge gaps and additional research needed on coyote population dynamics, reproduction, habitat use, movements, social dynamics, impacts on other wildlife species, and impacts on humans;
- Recommendations for partnerships with other agencies and organizations to provide assistance and education to citizens about living with coyotes;
- Recommendations for biological and social strategies to address coyote management issues;
- Recommendations for any statutory and/or regulatory changes need to reduce or eliminate legal barriers to effective coyote management; and
- Recommendations on a framework for gathering public input on the North Carolina Coyote Management Plan.

Social Aspects of Coyote Management

Public opinion about coyotes can vary significantly across the state depending on a person's location, interests, and value systems. The NCWRC is currently collaborating with North Carolina State University, the U.S. Fish and Wildlife Service, and Mitchell County officials to conduct surveys in the Charlotte Metro Area, on the Albemarle Peninsula, and in Mitchell County to describe the perspectives of citizens in these areas about coyotes and their management. Building on these efforts and to provide information to build the Plan, the NCWRC will conduct public input meetings regarding coyote management. These public input meetings will be held in each of the NCWRC's nine administrative districts. Input from these meetings will be used to both inform initial development of the Plan and as a basis for a statewide survey of citizens to scientifically determine their attitudes and opinions regarding coyotes and their management. Results of these human dimensions surveys and research efforts will drive development of the goals and objectives of the Plan and will form a significant basis for the final recommendations. This work will proceed concurrently with developing other aspects of the Plan.

Coyote Monitoring and Research

The NCWRC currently collects harvest data from hunters and trappers through annual surveys. However, to effectively address statewide coyote management issues there are other monitoring and research efforts needed. First, we must determine if coyote management is best prescribed in zones, as opposed to statewide approaches. For example, issues regarding coyote management are very different between urban and rural areas. While coyotes are ubiquitous across our State, relative abundance varies, as does prey abundance and other food resources. With that in mind, we must determine how to optimize coyote management in zones with varying social and biological conditions.

With increasing coyote populations, we must determine if predation on game species is causing significant population impacts (e.g., reducing deer populations), and if so whether modifications are needed in harvest seasons for the game species. The NCWRC is currently designing research to address large-scale predation issues. Similar to our efforts to understand bears in the urban environment, we will initiate research to determine the ecology of coyotes in the urban environment. While this research will not be completed before completion of the Plan, we will structure recommendations in the Plan such that as they become available results can be adaptively integrated into coyote management approaches. We must continue our harvest surveys and use these data to propose development of a population estimation model that is timely and sufficiently sensitive to be applicable across the state. Diseases can be important in managing coyotes, and other species that may be susceptible to diseases they carry, so development of a disease monitoring strategy will be included in the Plan. We must learn more about the dynamics of coyotes that move into (or through) Controlled Fox Hunting Preserves and their impacts on other species within and outside the Preserves. Finally, because coyote distribution and ecology are inextricably linked to our human ecology, we must develop approaches to monitor changes in human population dynamics in ways meaningful to management of coyotes.

Legal Considerations Regarding Coyote Management

As a relatively recent addition to N.C.'s fauna, rules and laws related to coyote management continue to evolve. Currently there is no closed season for hunting coyotes in North Carolina and hunting with electronic callers and at night is also allowed, except on private lands in Beaufort, Dare, Hyde, Tyrrell and Washington counties (due to range overlap with the red wolf, coyote hunting is allowed during daytime only and requires a permit from the NCWRC). Trapping coyotes is allowed during any open furbearer trapping season and any open fox trapping season established by local law. There is no bag limit for taking coyotes whether by hunting or trapping. Any landowner may receive a depredation permit from the NCWRC to kill coyotes on their properties. Even with all these allowances for landowners to manage coyotes on their properties through legal take, there are many legal considerations regarding coyote management in our State. With that in mind, we will review all current rules and laws to clearly demonstrate the legal status of coyotes in North Carolina and how these legal mandates influence their management. Because coyote management is intertwined with fox management, we will also examine how fox management influences coyote management. Finally we will evaluate and recommend specific additional steps that can be taken by the NCWRC and/or the General Assembly to reduce or eliminate legal barriers to effective coyote management.

Education and Outreach

For many citizens coyote management centers on managing situations in which coyotes have been a nuisance or caused damage; for others, is the sole presence of coyotes that creates unease. There are many approaches to coyote management and these will be explored and fully explained in the Plan. In addition, in this section of the Plan we will inform and educate readers about living with coyotes, especially in urban or suburban areas. The NCWRC's Wildlife Damage Control Agent Program and collaboration with the N.C Trappers Association provide many options for landowners to seek assistance in managing coyote nuisance situations. These options and the options for developing an integrated predation management program (which could benefit management of many other species) will be fully explored in the Plan. There are many exemplary agencies and institutions in our State and we will explore expanding collaborations with Cooperative Extension and other entities.

Recommendations

To be successful, management efforts directed toward coyotes must be broad in nature and adaptable to change. Based upon constituent desires determined through our social research, information presented in the plan, and the range of potential research outcomes, we will present a list of coyote management recommendations for immediate implementation and for integration as increases in our knowledge and socio-political opportunities allow. The North Carolina Coyote Management Plan will be submitted to the NCWRC Commissioners for consideration for adoption by March 2018.

Establish a pilot Coyote Management Assistance Program (CMAP) in Mitchell County

The NCWRC established a working group to address the action items outlined in statute (Section 4.35.

(a)). Initial action required meeting with representatives of the agriculture industry in Mitchell County to determine the most effective approach to meeting both the legislative and constituent needs related to coyote depredation on livestock.

Staff members with NCWRC held a meeting with Senator Ralph Hise, Mitchell county officials, livestock owners and livestock producers on November 30, 2015 in Mitchell County. The constituents in attendance clarified that property damage caused by coyotes in Mitchell County is primarily predation on livestock, and outlined immediate needs and potential solutions. The findings represent the foundation of the pilot coyote management assistance program.

During the initial discussions we identified the following needs:

- Increase understanding of coyote/human/livestock interactions, specifically depredation incidents in Mitchell County;
- Provide public outreach related to coyote biology and coyote management;
- Develop a communication system to place landowners in direct contact with individuals qualified to address and assess coyote damage; and
- Educate constituents on coyote management options and available coyote damage control techniques.

Based on the identification of these needs, NCWRC is working cooperatively with NCSU Cooperative Extension to design a coyote management assistance program for Mitchell County. The program will include onsite technical guidance to landowners as well as a trapper referral program for Mitchell County.

The program will immediately place the landowner in contact with local wildlife professionals (most often NCWRC biologists) that can visit their property, assess the situation and provide immediate advice as necessary to address issues. The program will provide landowners with a consistent point of contact to reach dependable and capable individuals to assist with lethal removal of depredating coyotes such as licensed trappers, Wildlife Damage Control Agents and as necessary USDA-Wildlife Services or other wildlife damage services. Most coyote management services will require some fee for service. Current discussions with Mitchell county officials suggest a potential shared cost model between the landowner, county and state or an individual contract model between landowner and trapper with cost and incentives negotiated between the two entities.

Working cooperatively with USDA Wildlife Services, the North Carolina Trappers Association and potentially NCSU Cooperative Extension, NCWRC staff are developing Coyote Management and Trapping workshops to help educate and train individuals on the biology, management and control techniques available for coyotes. The workshops will be a combination of lectures and skills based training on the field.

To address education needs, NCWRC is working cooperatively with Mitchell County Cooperative Extension and Mitchell county officials to design and implement an educational outreach strategy to include informational packages to be made available at the County Extension office. In addition, NCWRC will partner with Mitchell County to provide informational programs at organized events to inform constituents about the availability of onsite technical guidance by NCWRC wildlife biologists. Onsite technical guidance will focus on coyote biology and how to minimize predation using lethal and non-lethal control methods as well as alternative husbandry practices.

Once established, the pilot program will allow NCWRC and Mitchell County Cooperative Extension to evaluate the effect of varying levels of control/prevention tools on livestock loss and livestock producer satisfaction and subsequently be able to pass that information along to producers when issues or problems arise.

Human Dimensions

Normally, coyotes are elusive animals that avoid direct contact with humans. Being most active after dusk and before daylight, they are typically seen only at a distance. In most areas of North Carolina, coyotes continue to behave in ways that minimize their contact with humans. The majority of citizens have little personal experience with coyotes which may influence their perceptions.

The wide range in perspectives about coyotes prompts the need to determine a fundamental understanding of the public's primary issues and concerns. Coyotes come into contact with humans in a variety of ways, from just crossing a street or a field in an urbanized area to chasing and attacking pets or depredating livestock or other private property. The first step in solving any conflict with wildlife is to accurately identify the problem and address the wildlife species causing the problem. Because coyote damage is often not observed by humans as it is happening, heavy reliance must be placed on indirect evidence at the damage site. It should be noted that not all coyotes develop predation tendencies on livestock and coyotes that scavenge livestock carcasses may be incorrectly blamed for the deaths of those animals.

Initial conversations at the November 30th meeting with Mitchell County livestock producers suggested that actual predation on livestock is currently limited. However, there is concern that coyote depredation will increase. Furthermore, attendees shared information about depredation suffered by other producers

in Mitchell County. To assess the damage occurring in Mitchell County, a scientific survey is currently being developed and will be sent to all registered livestock/poultry producers in the county. The survey will allow producers to report specific damage and losses attributed to coyotes in 2015. A concurrent survey will be sent to producers in a neighboring county with similar livestock statistics to provide a control group for the research associated with the pilot coyote management assistance program in Mitchell County.

In addition to the survey, NCWRC staff will work directly with the local Cooperative Extension office, landowners, and other livestock predation experts to develop a system that livestock producers can access to specifically identify depredating animals based on examination of carcasses believed to have been lost due to predation. Because the emphasis should be on assisting producers with a reduction in loss due to predatory animals (regardless of the species of predator), identifying the cause of death and attempting to link that cause to a particular species will aid in determining the most effective treatment or methodology.

Coyote Control Methodologies

While coyotes have established a reputation for efficient and effective predation, the true extent and effect of coyotes preying on livestock is poorly documented in North Carolina. It is critical to understand coyote population dynamics and localized impacts is fundamental to developing statewide control methodologies. To determine the scalability of the pilot coyote management assistance program in Mitchell County, the NCWRC will have to obtain data from each region to account for differences in habitat, type of depredation occurring, and landscape characteristics.

Constituents attending the initial meeting in Mitchell County presented multiple recommendations for coyote population reduction, including the use of a bounty system. Historically, bounties have been used with little success to control coyote populations. The use of bounties for controlling unwanted wildlife, including predators, has been discontinued by most instituting authorities because they are ineffective in reducing actual damage and lack of economic viability. For example, the North Carolina coyote harvest for 2014-15 totaled 51,118 individuals. If each of those were reported for the purpose of collecting a bounty, the cost would exceed \$1.2 million annually at \$25 per animal for animals that are already being removed from the landscape. Killing individuals that are not causing damage can open territories for other individuals that have learned to depredate livestock or cause other damage.

Lethal removal of coyotes is not the only method available for reducing coyote damage, and in some circumstances it might be the least effective. Recommended non-lethal techniques for reducing coyote depredations on livestock include: confining or concentrating young or birthing livestock at times of vulnerability, removing carrion from pastures, improved fencing, and the use of guard animals. Protective fencing options are available and can exclude or deter coyote depredation in an area. Dogs, donkeys, mules, and llamas are used as effective livestock guards to reduce property loss by coyotes. Several Mitchell County landowners and livestock producers stated that they currently use guard animals (donkeys and llamas), and that they currently have minimal issues with coyotes.

When non-lethal techniques do not deter depredations, targeted or selected removal of offending coyotes may achieve management objectives. Trapping is the most effective and efficient means for targeting and removing coyotes that are actively depredating livestock. Removing one or two offending individuals in a small area may stop the problem. Several Mitchell County landowners also indicated that they had used trapping to address coyote issues in the past with varying degrees of effectiveness.

Trapping coyotes requires knowledge and a skillset not necessarily possessed by the average individual. Well trained and experienced coyote trappers will be required to successfully remove problem animals without exacerbating the issue by causing the coyotes to become more difficult to trap due to poor technique.

Next Steps

The NCWRC will continue to develop and implement the pilot coyote management assistance program in Mitchell County with its partners. In addition, the NCWRC will also be collecting information required to determine the scalability of this program. A final report detailing the findings will be presented to the Environmental Review Commission by January 1, 2017.