VERMONT FISH & WILDLIFE DEPARTMENT

VERMONT COYOTE POPULATION REPORT

Submitted to:
Vermont Legislature
House Committee on Natural Resources, Fish and Wildlife
and
Senate Committee on Natural Resources and Energy

Submitted by:
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Report to the Vermont Legislature on
Statewide Coyote Populations

Background and History of Coyotes in Vermont

Prior to European settlement, the coyote was limited to habitats west of the Mississippi River and was not believed to exist in Vermont historically. As European settlers moved west, cleared the land, and eliminated the native wolf, the more adaptable coyote moved east from the western prairies. As they spread eastward, they bred with wolves in southern Canada. As a result, the eastern coyote has a broader skull and is larger and heavier than its western counterpart. It has been speculated that these adaptations allowed coyotes to better hunt deer resulting in a more rapid colonization rate into the Northeast (Kays 2010). In addition, genetic analysis suggests that Vermont's current coyote population was established from a very small number of females crossing the St. Lawrence River into the state (Kays 2009). Since first sighted in Vermont in the 1940's, the coyote has attained population levels that are believed to be saturated. Biological research on coyotes reveals that they exist in family units that are highly territorial and thereby maintain self-regulated populations across the landscape. Except for regional and seasonal fluctuations due to food and habitat availability, Vermont's coyote population is unlikely to increase significantly beyond its current level.

The current open hunting season dates back to the early years when coyotes were termed "coydogs" and considered vermin newcomers. Today, the Department considers the coyote a permanent and valuable resident of the state, one that provides important ecological functions. Although it has not been here as long as some of our other native predators such as bobcat and the red and gray foxes, the adaptable and persistent coyote is here to stay, in part because it can occupy a variety of habitat niches, even those impacted by humans. In recent decades, in fact, the species has even been found to inhabit Central Park in New York City, downtown Chicago, and many other suburban habitats across the country.

The Department believes that both predator and prey species are vital components of a healthy ecosystem. Deer and other prey evolved with predators and as such, we neither regard predators as undesirable, nor do we view them as a significant threat to healthy game populations. In fact, it is a widely accepted truth among wildlife professionals that predators often help to maintain prey populations at levels that are in balance with their habitat. In an effort to foster broader public understanding and acceptance of the coyote and other predators, the Department has had a long history of working to dispel old myths surrounding the species and promoting the role and value of coyotes in our landscape.

Below are responses to Questions outlined in Attachment 2 of H.60

The Long-Term Deleterious Impacts Coyotes Have on Vermont's Game Populations:

The extirpation of wolves and subsequent establishment of coyotes across the Northeast has had a significant influence on many other wildlife species both positively and negatively. The degree to which such influence has occurred is wholly dependent upon many complicating factors stemming from the region's incredibly diverse and complex natural environment. Coyotes are both generalists and opportunists feeding on everything from insects, to fruits and berries, to snowshoe hare, small mammals, and deer. Writing for the Wildlife Conservation Society, Gompper (2002) states: "Coyotes are direct and indirect competitors with a wide array of species". Given this history and these characteristics, we have partitioned our response to this question into three sub-sections to better outline the literature documenting the influence of coyotes on prey species, other predator species, and non-game species.

Coyote Influence on Prey Species Also Hunted by Humans:

Vermont's wildlife evolved with a variety of predators including wolf, mountain lion, bobcat, fox, and black bear. Deer, snowshoe hare, turkey, and small mammals are all important prey for coyotes and other predators. Research done in New Hampshire suggests that it would take 8 deer, 105 snowshoe hare, **OR** 4,800 mice to meet the annual energy requirements of one coyote (Litvaitus and Mautz, 1980). Although coyotes may have some influence on these populations at the local scale, the availability of high quality habitat certainly has a much greater overall bearing on prey populations. As Vermont's landscape was transitioning from farms back to forest during the early-to-mid 1900s, there was an abundance of thick new growth that provided excellent habitat for "early successional" prey species such as snowshoe hare, deer, and grouse. Today much of the forest is maturing towards its pre-European condition, and until it reaches the late successional stage, optimum habitat for many of these early successional dependent forest prey species will likely continue to decline. Similarly, the ongoing development of our rural landscape is anticipated to have a negative effect on the state's deer wintering areas, an important habitat for maintaining Vermont's deer population. The availability of this critical habitat across the landscape is believed to help mitigate the negative effects of coyotes on Vermont's deer herd and, in fact, Canadian studies have found that the congregation of deer in wintering areas during winter helps to limit deer predation by coyotes (Messier and Barrett, 1985). However, human induced alterations of this habitat, such as roads and trails, can increase deer vulnerability to coyotes (Dumond et al, 2001). Protecting private lands from development so these lands can continue to be managed for **all** wildlife is an important goal of the Department.

Being habitat generalists, coyotes capitalize on a variety of prey species including deer and many studies around the country have documented this. Researchers in New Brunswick, Canada radio-collared 78 white-tailed deer fawns. Fifty of those fawns were captured in the spring as neonates and almost half (22) were dead by the end of November. Coyotes predated 9 of them, black bears killed 5, domestic dogs 3, and bobcats 2 (Ballard et al, 1999). In a Minnesota study, 66 neonates were captured over two winters. The overall survival rate after 12 weeks was 47%

with predation accounting for 86% of the mortality. Black bears were responsible for 57% of the mortality in 2001 and 38% in 2002 while bobcats accounted for 50% in 2002 (Carstensen 2009). A similar study was done in Pennsylvania (Vreeland et al, 2004) where 218 fawns were captured and radio-collared in both forested and agricultural landscapes. After 34 weeks, only 53% of the fawns in the agricultural landscape and 38% in the forested landscape were still alive. Of those that died, 33% were killed by black bear and 37 % by coyote. The remaining 27% died of other natural causes. Regardless, researchers concluded that there was "no evidence to suggest that the fawn survival rates observed were preventing [deer] population growth." However, at the northern edge of their range (i.e. Canada) where snow depths are higher, and winters are longer, coyotes may influence deer populations (Messier et al 1986) as they tend to focus more on deer than snow shoe hare in areas with higher winter severity (Patterson et al, 1998). In most parts of Vermont, however, we do not believe that to be the case. Although coyotes take deer in Vermont, research done in the 1980's (Person, 1988) in the Champlain Valley found that they also ate woodchucks, small mammals, insects, various fruits and berries, and livestock carrion.

Regardless of the scientific consensus surrounding coyote diet and their limited impact on prey populations, there remains a deeply rooted public perception that coyotes compete with hunters for the same species. Although coyotes and people, both predators, do vie for deer and other prey, in almost all cases, study results suggest that coyotes have no long-term negative impact on these populations. Habitat quality and harsh winter conditions appear to be the most important factors influencing deer numbers in Vermont. In addition, the Department considers predation as a factor when developing deer management strategies.

In summary, we offer the following statements regarding coyotes and their interaction with deer, based on the current state of knowledge outlined above:

A. Being habitat generalists, coyotes capitalize on a variety of prey species including deer. Many studies around the country have documented that coyotes, black bears and bobcats all kill fawns in the spring. Coyotes and bobcats also kill deer during the winter months. However, researchers have concluded that there is no evidence to suggest that the observed mortality rates prevent deer population growth.
B. Coyotes are also scavengers on carcasses of deer that may die of malnutrition or other causes. Signs of coyotes having fed on a deer carcass are not conclusive evidence that coyotes killed the deer.
C. Even the complete removal of coyotes from Vermont would not ensure a healthy, abundant deer herd. Winter deer habitat is the "critical" factor that limits and controls total deer numbers in the longer term.
D. We are not aware of any scientific evidence from studies done in the Northeast that indicate coyotes either control or limit the numbers of deer in healthy deer populations particularly if coyote predation is a consideration when determining antlerless harvest rates (Robinson 2014). To the contrary, there are numerous scientific studies that suggest coyotes do not regulate deer populations.
E. Vermont's deer herd is healthy although there may always be criticism from some interest groups that deer are not as plentiful as desired. In Vermont, winter severity is perhaps the most significant factor affecting deer population fluctuations and we believe

that this largely explains any temporary variability in deer numbers. It is important to recognize that natural populations of all wild animals fluctuate in numbers through time.

F. Coyotes are territorial animals and defend their territories aggressively. The frequency of aggressive encounters between coyotes escalate as their population densities increase, resulting in reduced reproduction and pup survival. These behaviors limit the maximum number of territories that can exist in Vermont and limit the maximum number of coyotes that can be sustained across the state.

Coyote Influence on Other Predator Species:

It is important to note that in addition to influencing prey populations, the establishment of coyotes in Vermont may have affected native predator species as well. It appears that bobcats, for example, were able to capitalize on the extirpation of wolves, mountain lions, and lynx prior to the arrival of coyotes. Without competition from these predators, bobcats were able to cache deer and feed on the same carcass for weeks at a time. The apparent success of bobcats during this time period was evidenced by the relatively high annual harvest they sustained as a result of a bounty that existed on the species in Vermont until 1971. Annual number of bounties paid frequently exceeded 200 animals and numbered as many as 500 while having no apparent or detectable effect on the bobcat population. With the arrival of coyotes who readily keyed in on and consumed cached carcasses, bobcats had a more difficult time persisting at the northern edge of their range resulting in a marked reduction in their population in Vermont that lasted for several decades. Similarly, Vermont's red fox population declined as coyotes established home ranges in what was once excellent fox habitat. A Vermont research study conducted in the 1980's evaluated the influence of coyotes on red fox populations in Vermont's Champlain Valley (Ingle, 1990). This study clearly documented a variety of avoidance behaviors (both spatial and temporal) of red fox in response to coyote presence and, in fact, concluded that red fox had undoubtedly lower populations at the time of the study than prior to the arrival of coyotes in the 1940's. In Maine it was found that the presence of resident coyotes appeared to limit the available habitat for red fox (Harrison, 1989). In consideration of these findings, it is believed that the establishment of coyotes in the Northeast precipitated a realignment of these mesocarnivore populations across the landscape resulting in a variety of cascading effects on the ecology of the region.

Coyote influence on non-hunted species:

Even moderate levels of forest fragmentation is likely to elevate predation rates on a variety of bird and small mammal populations and could have a profound effect on species diversity and richness (Oehler and Litvaitis, 1996). The cascading influence of coyotes that results in a decline in mesocarnivores, particularly foxes and raccoons, can result in an alteration of bird, rodent, and even plant communities. In fragmented landscapes, coyote presence has been shown to have a beneficial effect on bird and small mammal species diversity because they have a negative impact on domestic cats, raccoons, and opossum, all of which are significant predators of song birds (Crooks and Soule, 1999). Other states have experienced an increase in waterfowl

nesting success due to coyote interference competition and predation on red foxes which actively prey on waterfowl. (Sovada 1993).

In the Great Lakes region, areas that supported higher wolf densities tended to have fewer coyotes and therefore more foxes and snow shoe hare. As a result, in two of the three study years fewer mice also existed in high wolf areas presumably because of increased predation by foxes (Flagel et al, 2017).

In short, the influence of coyotes on landscape ecology has been widely documented in the scientific literature but assessing the net benefit or detriment of this influence remains a difficult, if not impossible, task owing to the complexity of these natural systems.

Current Coyote Practices and the North American Model:

The North American Model (Model) was developed in response to a long history of exploitation and the unregulated taking of wildlife which subsequently decimated many of North America's most iconic species. Out of the ashes grew a conservation ethic that brought many species back from the brink of extinction. In a review of the Model, Shane Mahoney writes:

"Thus, was launched one of the great North American inventions; namely, a citizen activism for nature based principally upon a sustainable use mantra and freighted primarily by a vested interest motivation. While unrestrained commercial slaughter was the juggernaut endangering North America's wildlife, regulated hunting became the founding influence and remains the spinal cord of the world's longest standing movement for wildlife protection, use and enhancement. This social and political movement eventually coalesced into a systematic arrangement of conventions, policies and laws that we recognize today as the North American Model of Wildlife Conservation (Mahoney et al 2016?)."

The seven tenets of the Model are aspirational and serve as a framework or reference for evaluating where we have been and where we are going (Organ, pers com). Central to the Model is the public trust doctrine, the idea that wildlife is owned by everyone and held and managed in trust for future generations by the Government. The Department takes this tenet very seriously and strives to manage all wildlife for the use, benefit, and appreciation of the broad spectrum of Vermonters. It is important to note that the modern existence of many of our iconic species did not occur by accident but by the concerted efforts on the part of the Department, legislature, partners, and citizens. Extirpated species such as beaver, wild turkey, fisher, and marten were reintroduced and recovered using funds, at least in part, generated by hunters and trappers and the success of those efforts have resulted in the increased enjoyment and benefit of all of Vermont's citizens. The habitat protection efforts of the Department both through land acquisition, technical assistance to private landowners, and regulatory work (Act 250 and Act 248) also benefit not only hunters and trappers but all Vermonters. The nongame and endangered species recovery efforts are a core part of the Department's mission and ensure that native wildlife will be available for the enjoyment of future generations. We also recognize that wildlife have intrinsic value and we manage populations, including coyotes, for all the values they can provide to society, from hunting and use of their pelts to the viewing of a family group hunting field mice or simply hearing their night time yips and howls. However, these values

must be weighed against the risks coyotes can pose to people, pets, and livestock. This requires balancing the interests and needs of a large cross-section of the public while maintaining the health, sustainability, and ecological role of the population in question.

Tenet four of the Model, "wildlife can be killed only for a legitimate purpose", is taught in mandatory hunter education courses throughout Vermont. We promote the utilization of, and respect for, coyotes and do not actively support coyote hunting contests that advocate coyotes as vermin. We consider coyotes a sustainable natural resource that can and should be managed as such. Therefore, we do not believe that the hunting or trapping of coyotes is contrary to the North American Model. To a great degree, how the animal is perceived both by hunters and the public influences alignment to the Model. Recognizing the importance of the coyote to the natural system and respecting the animal and the valuable role it plays, contributes to the observance of the Model on the part of hunters and the public. The attached article (Attachment 1) from a 1999 furbearer newsletter is just one example of the Department's attempt to raise the image of the coyote in the eyes of trappers and hunters.

The fact that coyotes are an animal that can easily become habituated to humans also justifies the need to manage to minimize negative interactions with humans. This is critically important because coyote/human interactions influence public support for maintaining these animals on the landscape. In addition, enhancing the public's positive connection to the out of doors is vital to the future of conservation. The chief wildlife biologist from New York state, Gordon Batchelder, put it this way:

"If we are to be successful in conserving our wildlife legacy, and healthy ecosystems, we need people who care. We need people who are passionate about nature. We have lost an entire generation of young people to a lifestyle of scheduled and structured recreation, all supervised by a parental class that fears the outdoors. Their appreciation for nature is superficial and ephemeral. A half-day trip to a county park is no substitute for a predawn walk across a frost-covered field."

This speaks to the heart of wildlife conservation-- connecting people and wildlife so that both benefit.

Coyote Population Estimate:

Vermont's coyote population estimate is based on research that was conducted in the Champlain Valley in the 1980's (Persons 1991) and on the findings of other research completed since throughout the region. Collectively, these studies provide the underpinnings of our understanding of coyote habitat use and behavior which ultimately regulates the abundance of the species across the varied landscapes of Vermont.

Coyotes are highly territorial and exist in family groups that defend a core home range of 4 to 8 mi^2 from other coyotes. Coyote productivity and home range size is based on habitat and food availability and therefore the population varies from season to season and year to year. However, given that Vermont, in general, is excellent habitat for coyotes we estimate that most of the available home ranges are occupied and that there are many years where dispersal is

delayed. Therefore, we have calculated that there is an average of 7500 coyotes in Vermont but that the population may vary from as many as 9,000 in the spring (during pup rearing) to as few as 6,000 in the winter due to the natural cycles of annual mortality (i.e. disease, starvation, intraspecific competition, etc.) and dispersal. Such annual fluctuations in the population are largely dependent upon a variety of environmental factors including, among other things, winter conditions, prey availability and competition. Despite this inherent variability, Vermont's coyote population estimate is not out of line with estimates from other jurisdictions. Richer et al. (2002) found that in the rural landscapes of southeastern Quebec there were an average of 2.7 animals/km^2 which would extrapolate to approximately 6,300 animals in an area the size of Vermont.

Given the territorial nature of coyotes, their adaptability and their ubiquitous distribution throughout the state, Vermont's coyote population is unlikely to change significantly beyond its current level outside the bounds of natural seasonal variation.

Scientific, Biological Basis for Ppen Season Management:

As stated above, part of ensuring that Vermont's native wildlife populations are managed sustainably for the enjoyment of future generations, is to maintain a citizenry that cares about our wildlife. Coyotes are still a species often vilified by much of the public and historically there has been strong opposition to any reduction in the coyote hunting season. This is not unique to this state. In Vermont, it is generally because they kill deer or livestock. In other states, it is also because they periodically attack or harass pets and/or people, particularly children. In some suburban areas in other states, where only limited hunting, if any, is allowed, coyotes have attacked dogs being walked on a leash and/or bitten the owners. Three percent of US National Parks have reported habituated coyotes harassing humans. Both of the reported human deaths caused by coyotes, a 3-year old girl in California and a 19-year old female hiker in Cape Breton Highlands National Park, occurred in areas where no hunting was allowed. In states, cities, parks or municipalities where trapping and/or hunting is banned, coyotes can become habituated, particularly if fed. Negative human/coyote interactions increase with little or no recourse for resolving the problem. (http://en.wikipedia.org/wiki/Taylor_Mitchell http://en.wikipedia.org/wiki/Kelly_Keen_coyote_attack)

Researchers compiled 142 reported attacks from coyotes on 159 victims between 1960 and 2006 (White 2009). In the city of Chicago, newspaper articles that document human-coyote conflicts have increased twenty-fold since the 1990's (White 2009). Connecticut recently expanded their coyote season to year-round (it previously had been closed the month of May and two weeks in the fall) in part, to provide an additional tool for dealing with human/coyote conflicts (P. Rego, pers com). The hunting and trapping seasons in Vermont are likely what has helped to maintain distance between coyotes and humans, and minimize negative interactions. We believe that a benefit of the current hunting regime is that Vermont's coyotes are "shy" and wary of people. This wariness actually works in favor of the coyote, as we have fewer human/wildlife conflicts which often result in coyote mortality and increased public hatred for, and fear of, the coyote.

In Vermont, over the last 10 years, 69 incidences of livestock depredation have been reported involving 121 individual animals (cows, sheep, turkeys, etc.). This is likely way below the actual number as fewer and fewer farmers report coyote activity as most now understand their options and try to handle the situations on their own. Most of these events occur in either the spring when the pups are born or in the fall when the adults are training them to hunt. We have, in the past, worked with various organizations to promote non-lethal predator deterrents and husbandry practices that minimize the risks to livestock and over time many farms have adopted these practices. In addition, we will often recommend against the removal of coyotes that are not killing livestock as these family groups may be "protecting" the area from other depredating individuals. It is possible however, that the long hunting season also contributes to the wariness of coyotes and helps to minimize depredation events.

Most importantly, from a biological perspective, we do not feel that the current level of hunting has had a long-term negative effect on the population; if we did, we would very strongly advocate for a change. Research has suggested that coyote reproductive rates increase when they are aggressively hunted or trapped. In the West, studies indicate that only very concerted and sustained coyote control efforts can decrease and sustain reduced coyote populations. It has been estimated that a population of coyotes must be reduced by 75% or more **each year** to keep the population from increasing towards the original population number (Gompper, 2002). Therefore, it is unlikely that even sustained hunting will have a long-term effect on the population. Given what we know about coyote biology and coyote control programs in the West, we do not believe that the current management regime for coyotes is putting the population at risk and may, in fact, positively influence reproductive rates. We are convinced, however, that it does help to keep our coyotes wary and minimize these human/coyote conflicts. In the end, although counterintuitive, the year-round hunting of coyotes may actually contribute to the saving of coyotes in that it maintains a public that supports the sustainability of coyotes in Vermont.

Finally, we do collect effort and harvest information on coyotes from trappers in an annual trapper mail survey. In the 1980's we worked with the University of Vermont to research coyote populations in the Champlain Valley and we are currently investigating ways to collect additional data from coyote hunters. We believe we are providing optimum opportunities for utilization while still maintaining a sustainable population and, at the same time, limiting potential conflicts with people and pets. In addition, we believe that other intrinsic benefits related to coyotes are still available to the general public such as viewing and listening opportunities. It is rare in rural Vermont, to run into someone who has not seen or heard a coyote in the wild.

That being said, in recent years, competitive coyote hunting contests have been held by local hunters. Unlike its counterparts in some states, Vermont's Fish and Wildlife Department does not sponsor or promote or encourage coyote hunting tournaments and we do not believe that such short-term hunts will have any measurable impact on prey such as deer. However, these activities are not prohibited by Vermont laws and regulations. In addition, unlike some other states, the Department does not promote a bounty on coyotes or any other form of predator control in an effort to "protect" game species as we understand that these kinds of efforts are not effective. In fact, attempts to eradicate or control coyote numbers in western states have been

extremely costly and have met with failure. Such efforts now are generally focused on eliminating particular coyotes that are causing stock losses. Where significant reductions in coyote numbers are locally achieved, the vacated habitats are soon recolonized by dispersing sub-adults who move in from neighboring locations thereby rendering any local population reductions short-lived. Some researchers have suggested significant increases in coyote reproductive rates or coyote densities in areas where coyotes are intensively controlled (Voigt and Berg, 1987). In addition, coyotes form monogamous pair bonds in which the adult (Alpha) males and females prohibit juvenile members of their family groups from mating. If an Alpha female is killed, however, another female will often readily replace her in the breeding hierarchy reducing the likelihood of any interruption in the family group's annual breeding cycle. When coyote populations are exploited, productivity and pup survival increases. Because of these behavioral and biological responses of coyotes to exploitation, coyote populations rebound quickly from any effort to control their numbers rendering such efforts ineffective.

Given the characteristics of coyote life history cited above, there is little likelihood that any long-term reduction of Vermont's statewide coyote population is achievable via competitive coyote hunting contests. Even on the local level, there may be a short-term decline in the population but the resulting increase in reproductive rates will offset any "gains". Importantly, beyond what impact such contests may or may not have on coyote populations, these kinds of competitive coyote hunts are raising ethical objections on the part of some members of the public and could possibly jeopardize the future of hunting and/or affect access to private lands.

Coyotes have plainly made Vermont their home and presently play an important role as a medium size carnivore. Barring some catastrophic disease or other landscape scale event, they are here to stay. Predator/prey relationships are extremely dynamic and complex, and are the result of a variable series of factors that defy a simple explanation or "quick fix". Regardless, the Department values the role predators play in maintaining healthy and dynamic ecosystems and endeavors to promote management strategies for these species, including coyotes, that foster a broad public understanding of, and appreciation for, their intrinsic values while ensuring the sustainability and health of their populations.

Summary of Regulations From Other States:

Attachment 2 outlines the coyote hunting and trapping seasons by state. The table below provides a summary of the findings. Thirty nine of the 50 states essentially support a year-round hunting season including Vermont. Six others have some sort of minimal closure based on management units or public lands but are otherwise open to coyote hunting year-round. Four states have an established hunting season of some duration less than year-round while at least three states continue to promote coyote bounties or other "incentive" programs.

No Closed Season	39
Minimal closed season	6
Established seasons	4
Established trapping seasons or restrictions	25
Night Hunting	
Year round	38
Established night seasons	9
Artificial light allowed, including restrictions	35
Night hunting allowed; no artificial light	6
Night hunting Prohibited	11

Differences in the Department's Management of Coyotes Versus Other Furbearing Species:

The Department takes its mission of fish and wildlife stewardship very seriously. Besides the fact that both the state Constitution and legislative statute dictate the Department's stewardship responsibilities (see below), Department staff are driven by the overall Mission: T*he conservation of fish, wildlife, plants, and their habitats for the people of Vermont.* We strive to manage all wildlife species according to these overarching principles and our regulatory and statutory guidance:

§ 4081. Policy

(a)(1) As provided by Chapter II, § 67 of the Constitution of the State of Vermont, the fish and wildlife of Vermont are held in trust by the State for the benefit of the citizens of Vermont and shall not be reduced to private ownership. The State of Vermont, in its sovereign capacity as a trustee for the citizens of the State, shall have ownership, jurisdiction, and control of all the fish and wildlife of Vermont.

(2) The Commissioner of Fish and Wildlife shall manage and regulate the fish and wildlife of Vermont in accordance with the requirements of this part and the rules of the Fish and Wildlife Board. The protection, propagation control, management, and conservation of fish, wildlife, and fur-bearing animals in this State are in the interest of the public welfare. **The State, through the Commissioner of Fish and Wildlife, shall safeguard the fish, wildlife, and fur-bearing animals of the State for the people of the State, and the State shall fulfill this duty with a constant and continual vigilance.**

(b) Notwithstanding the provisions of 3 V.S.A. § 2803, **the Fish and Wildlife Board shall be the State agency charged with carrying out the purposes of this subchapter**.

§ 4082. Vermont Fish and Wildlife Regulations

(a) The Board may adopt rules, under 3 V.S.A. chapter 25, to be known as the "Vermont Fish and Wildlife Regulations" for the regulation of fish and wild game **and the taking thereof** except as otherwise specifically provided by law. The rules shall be designed to maintain the best health, population, and **utilization levels of the regulated species** and

of other necessary or desirable species which are ecologically related to the regulated species. The rules shall be supported by investigation and research conducted by the Department on behalf of the Board.

Our first obligation to all wildlife species is to ensure the long-term sustainability of their populations for the people of Vermont. State Fish and Wildlife Agencies use a variety of tools to manage species susceptible to over harvest including the implementation of regulated seasons, bag limits, or when necessary, season closures. We partition our limited capacity and funds towards species that are most sensitive to environmental threats or overharvest. In the case of furbearers, we put significant effort into actively monitoring endangered lynx and marten through track count and camera surveys. In addition, trappers and hunters are required to turn in the carcasses of fisher, otter and bobcat harvested during the season so that additional sex and age data can be collected to more closely monitor these potentially more sensitive predator species. We have worked with the University of Vermont in the past to conduct both coyote and bobcat radio collar studies to learn more about home range and critical habitat needs. These intensified management/research strategies require additional staff time and money. Given that these resources are limited, the furbearer project has historically taken a pragmatic and conservative approach by devoting fewer resources (other than those mentioned above) to those species with very robust populations (e.g., coyotes, raccoons, skunks) and focusing more resources on those species that are less resilient.

Our second obligation is to maintain public support for these species so that future generations promote those actions (e.g., habitat conservation, climate resiliency, land acquisition) that ensure the future of all wildlife in Vermont. It is our experience that much of the public values wildlife until they become a "nuisance" or show up on their back porch (black bear), flood their driveway (beaver), decimate the fish in their pond (otter), or eat their garden (deer). Coyotes are one of those wildlife species that can quickly shift to "vermin" in the eyes of the public. Although we do not manage specifically to minimize wildlife conflicts, in this case, as stated above, the year-round hunting season likely contributes to reducing human/coyote interactions.

The Impact of an Open Season on Vermonters—Polarization of Communities etc.:

The clash of values over the coyote season is not unique or limited to this one issue. Attitudes towards hunting in general may be shifting as human values transition from the predominantly traditionalist viewpoint which existed in the United States prior to World War II (WWII). Although traditionalists generally had great respect for wildlife (Teddy Roosevelt, Aldo Leopold, Ding Darling) they believed that humans were part of the natural system and that wildlife existed, in part, to be sustainably utilized. For these folks hunting was, and still is, a deeply held and cherished cultural identity (Manfredo et al 2017). A rise in mutualist values began in the latter half of the 20th century and were associated with a post-materialist cultural change which removed more people from direct contact with wildlife (suburbanization and urbanization). Manfredo (2009) suggests that given the human tendency to anthropomorphize, people began to view wildlife in more egalitarian ways.

Thankfully, in Vermont there is likely significant overlap between the two points of view in that both groups generally value wildlife and support the conservation of species. In a 2015 Vermont public survey, 91% of all citizens thought it was important that people have the opportunity to participate in wildlife-related outdoor recreation such as hunting, fishing and wildlife viewing (Duda 2015). This is up from 80% in 2000. Even more compelling, 81% of the general public and **86% of hunters and anglers** strongly believed that threatened and endangered species must be protected, up from 37% in 1995. Capitalizing on this common ground is critical to the continuing conservation of our fish, wildlife, and the habitats they depend on. However, some researchers suggest that as fish and wildlife agencies attempt to "broaden the tent" and the voices of those with contrary beliefs gets louder, there will be a backlash that will make it more difficult to undertake the changes necessary to move conservation forward. As traditionalists feel more threatened, they will tend to dig in their heels and the polarization will likely become more acute. Change takes time and will require that traditional stakeholders, as well as the general public, trust the Department's motivation and science. Vilifying and/or undermining each other will only serve to slow the process down. Conversely, bringing these disparate groups together and building communication and respect under the umbrella of conservation is a huge challenge because it requires compromise and finding common ground, but it is one that is necessary to the future of wildlife.

In general, prior to WWII, most of the public viewed coyotes only as a pest—something to be eradicated primarily because of their potential impact on domestic livestock. Since then we have made slow progress regarding the public's acceptance of predators. Public opinion surveys from the early 1980's suggest that although attitudes about coyotes may have softened slightly since the 1940's, coyotes and wolves were still disliked --only slightly less than lizards, sharks, and vultures (S. Kellert 1984). Of the 33-species presented to the respondents for ranking, wolves and coyotes rated 21 and 22 respectively. Today, public attitudes towards these species continues to be extremely polarized, although thankfully more enlightened than the 1940's. The general public's attitudes towards both coyotes and wolves are significantly more positive than 30 years ago, however rural residents tend to be less accommodating to coyotes and wolves and their associated conflicts. This is likely because rural residents may have direct experience with coyotes or wolves related to perceived or real depredation on domestic livestock, pets, deer, and elk. Researchers hypothesize that urbanization has driven this value shift in favor of predators possibly combined with the popularization of nature shows on television (George 2014). Until recent decades, the year around coyote hunting season had minimal impact on other residents of the state as the activity was often more opportunistic than targeted. Recently, however, the hunting of coyotes through calling and hounding has increased in popularity causing, in some cases, conflicts between landowners and the general non-hunting public.

However, in our experience, shifting public attitudes in either direction takes time, education, and science-based research. To that end, over the years, the Department of Fish and Wildlife has worked hard to dispel the myths and soften the public's attitude towards predators in general, and coyotes in particular, given that coyotes at least partially fill the niche left by the wolf and are expected to continue to thrive in Vermont into the future.

Strategies for Building Bridges:

Polarization of the hunting and non-hunting communities, especially those that care about the future of wildlife and their habitats, is one of the greatest threats to the future of wildlife conservation**.** The long-term sustainability of wildlife in Vermont, and the nation, will depend on finding common ground around these issues so that efforts can be focused on the real threats to wildlife and their habitats. In today's world, regulated and legal hunting or trapping (as opposed to poaching) are not putting species at risk. Rather, widescale habitat loss and fragmentation, climate change, and invasive species are the real threats to wildlife populations world-wide. Polarization on issues that have no long-term effect on the sustainability of these populations is counter-productive and undermines our ability to work constructively on the issues that really matter for conservation.

Therefore, bringing disparate groups together to work on common threats is critical to our future. To that end, the Department has sponsored two "Wildlife Congresses" in an attempt to find and agree on common issues that can be tackled together to maintain wildlife populations into the future. Vermont is a small enough state that we should still be able to foster face to face conversations that begin to build trust, if not agreement. This has historically been the "Vermont way" --thoughtful, respectful, and civil dialogue even in the face of disagreement. It is discouraging to see this little, usually rational, common sense state, follow the national descent into unproductive polarization and maliciousness on both sides. It is true that building trust and finding common ground takes time and work. In the meantime, we cannot leave behind, or fail to acknowledge, the folks that traditionally paid for all the good conservation work that has been done to date.

The Department does not apologize for supporting the rights to hunt, fish and trap – and in fact feel that we are directed to advance those rights by the Constitution, statute and mission – but we also recognize and respect the rights of those who oppose hunting or trapping because of their personal values or beliefs. Although we encourage folks to learn more about the hunting and trapping culture, we recognize that there are value-based reasons to disagree with these activities. Obviously, everyone has the right to their own belief system and should take appropriate steps to live their lives accordingly. However, the Department's responsibility is to balance the interests and needs of **all** our citizens, including those that have grown up in the hunting and/or trapping culture. In addition, Government's role is to protect the rights of the minority as designed by the Constitution. *"Indeed, as **democracy** is understood today, the **minority's rights** must be protected no matter how alienated a **minority** is from the majority society; otherwise, the majority's **rights** lose their meaning". [www.annenbergclassroom.org/term/majority-rule-and-minority-rights]*

The Department has long recognized that wildlife management is, in large part, people management. To that end, we have always welcomed and gone to great lengths to collect input from the public regarding our policies and rule-making. Both our Strategic and Wildlife Action Plans went through a lengthy public input process. Our last rule change took two years to finalize, in part because we held multiple public hearings. We hire outside consultants to conduct public surveys to ensure that we are representing the interests and values of a wide cross section of Vermonters and we do our best to base our decisions on the best available science.

As long as hunting and trapping do not pose a risk to a wildlife population, or limit the general public's ability to see or experience a species, then the Fish and Wildlife Board's charge according to ***§ 4082*** is as follows: *"The [board] rules shall be designed to maintain the best health, population, and* ***utilization levels of the regulated species…"*** suggesting that trappers and hunters have the right to harvest game as long as they follow the legal standards out-lined in statute or regulation. It is critical however, that they too, show respect for others, for landowners, and for the wildlife that they harvest and recognize and respect the fact that wildlife have an intrinsic value that is critically important to many members of the public.

Department Recommendations to the Board (if any):

As with all species, responsible management includes a reliance on scientific research, monitoring, literature review, and even anecdotal feedback from the public. Any change in rule is publicly noticed, public hearings are conducted, and comments considered and incorporated prior to finalizing any rule. There has been no recent rule-making around coyotes, in part because the biological data suggests that the population is not at risk and because the public has very polarized views of this animal. Many other states have expanded seasons, instituted contests, and/or implemented bounty programs to "control" coyotes. We do not endorse any of these types of programs because we do not believe they have any long-term beneficial effect on the population nor do they foster the respect deserved by any harvested animal. We believe that our current management strategies are maintaining a wild population of coyotes and therefore minimizing human/wildlife conflicts while ensuring sustainable populations for future generations.

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Featured Species: The Eastern Coyote *(Canis latrans)*

The Eastern Coyote (*Canis latrans*) could be one of the least understood and most maligned creatures of the forest. This relative newcomer to Vermont is an incredibly adaptable and, therefore, successful predator. Since the 1940s when the coyote was first found in Vermont, it has moved east to Newfoundland, Prince Edward Island, and south to New York City! Today, the coyote is an established member of Vermont's fauna.

Natural History

Much of the coyote's success can be attributed to human changes to the ecosystem that occurred in the 1800s. Because of the conversion of western prairies to agricultural land, the loss of eastern forests to logging and agriculture, and unregulated harvest, species such as the mountain lion and timber wolf were extirpated from their natural environment. With an abundant supply of prey and little or no competition from species higher up on the food chain, a void was left in the northeast which allowed the western coyote to expand its range to the east. The coyote as a species deserves our respect because of its adaptability to human activities and its resilience despite man's every attempt to exterminate them.

The eastern coyote first began to appear in Vermont in the late 1940s. Since then, the species has established itself throughout Vermont and the Eastern United States. Today Vermont is home to a stable coyote population, estimated to be around 1,500-4,200 depending on the time of year. This is due to the coyote's ability to adapt to humans, and its varied diet of insects and berries to rodents and deer.

Description

The eastern coyote looks very similar to its western relative although definitely heavier. Males generally weigh 30-40 lbs, and females average 30 pounds. The eastern coyote is heavier and less sleek than their western kin, making them appear almost wolf-like. Research has shown that during the coyotes eastward migration, the species may have interbred with wolves which would explain the difference in appearance between eastern and western coyote.

The coat of the eastern coyote is grizzled, often darker in summer and lighter in winter. The head and legs have variations of reddish fur contrasted with darker fur. Creamy white fur is found under the chin and throat and also the belly and chest area. The tail is grizzled above and lighter below, generally, but with two distinctive features; a black spot one-third of the distance down from the base of the tail's upper surface and a definite black tip.

> The coyote and hunter walk on common ground. We seek out the same quarry. We share the same desire in finding that quarry. We both are hunters. We both are predators. And we both have the right to the bounty that lies within the forest...
>
> We fight, tooth and nail, against the anti-hunters. We reason and plead with the non-hunters, trying to convince them that hunting is a natural, ethical, and noble pursuit. But, in the same breath, we curse and condemn the coyote for his natural behavior, killing game. As hypocritical as this may sound, it is the truth. How can we, with a clear conscience, curse the coyote without cursing ourselves? Impossible!
>
> *— A Maine Hunter*

The home range of the eastern coyote has been estimated at 15 square miles. Depending on density and prey availability, young coyotes will disperse at about 5 months although some may not leave until their 2nd year. Coyotes are territorial and will defend their home range from interlopers. Dispersing juvenile coyotes must find unoccupied areas to establish new home ranges thus limiting the numbers of coyotes in any particular area.

The diet of the eastern coyote can be best described as a generalist which is in part what makes the coyote so successful. Coyotes are omnivores and will eat virtually anything depending on the availability. Their diet consists of small rodents, plants, hare and rabbits, insects, and livestock carrion. Deer also make up an important part of the coyote diet. The coyote will take advantage of the Vermont winters by feeding on the deer that may not have otherwise made it through the long winter. During spring and summer, fawns may also play a role in the coyote diet. In Vermont, deer managers take this factor into consideration when managing the deer herd. In fact, in spite of the coyote, deer numbers in Vermont have continued to increase over the last 10-15 years.

Reproduction/Family Unit

Mating occurs during late January and early February. Gestation lasts approximately 2 months with young being born in mid April. Eastern coyotes are monogamous, meaning they mate for life. Both adults assist in care and rearing of young. The number of young produced depends on population densities, prey availability, and other environmental conditions.

The family unit consists of a mated pair, pups, and possibly yearlings. On occasion when conditions are dire, non-reproducing individuals may be allowed into the family unit. Coyotes tend to stay together in groups or packs when prey is larger or when high densities of coyotes prevent dispersal.

What is a Coydog?

Research has shown that coyote-dog hybrids (coydogs) are not a reproducing population. Female coydogs actually come into season too early causing poor pup survival rates. In addition, male coydogs do not assist in the rearing of their young which also contributes to litter failure. Therefore, crosses between these two species, when they infrequently occur, is generally limited to a single generation.

State	Status	Closed Season	Bag Limit	Night Hunting	Trapping	Comments
AL	Unprotected	No	None	No	Year round by landowner or agent; first Saturday in November through Feburary otherwise.	
AK	Furbearer	Most units NO; some YES	Most units none	No artificial light	Varies, but generally November through April.	
AZ	Predator	No	None	Yes from 12/1 to 5/31; artificial light permitted	Nov - Feb	
AR	Furbearer	Yes. Open: July - Feb	None	Yes. Artifical light allowed with some exceptions	Aug - March	
CA	Nongame	No	None	Yes, it most areas. Artificial light permitted	Year-round	Competition hunting is banned.
CO	Small Game	No	None	Yes. Arificial light is allowed but permit needed for public land.		Footholds are illegal.
CT	Furbearer	No (no hunting on Sundays)	None	No	Nov - March 15	
DE	Furbearer	Yes. Open: Sept - Feb	None	No	Dec - March 10	
FL	Furbearer	No	None	No	Year-round	Foothold by permit.
GA	Furbearer	No	None	Yes. Artifical light allowed with some restrictions.	Year-round	
ID	Predator	No	None	Yes. Arfiical light allowed.	Year-round	
IL	Furbearer	No	None	Yes, from mid-Nov throug mid-March. Arificial light allow	Varies but generally November through January	
IN	Furbearer	No except on public land (same	None	Yes. Artifical light allowed.	Oct 15 - Mar 15	
IA	Furbearer	No	None	No	Nov - Jan	
KS	"Coyote"	No	None	Yes. No artifical light.	Year-round	
KY	Furbearer	No	None	Yes, from Feb-May. Artifical lights allowed.	Mid Nov-Feb	
LA	Furbearer	No	None	No	Mid Nov - March	
ME	Furbearer	No	None	Yes, from mid Oct -Dec. Articifical light allowed	Last weekend in Oct - Dec	
MD	Furbearer	No	None	Yes, from Oct 15- Mar 15. Yes.	Nov 15 - Feb 15	
MA	Furbearer	Yes. Open: Mid-Oct - early Mar	None	No	Nov 1 - Nov 30	Footholds are illegal.
MI	Furbearer	No	None	Yes. Artificial light allowed.	Oct 15 - march 1	
MN	Unprotected	No	None	No	Year-round	
MS	Nuisance	No, though can be established	None	Yes. Artificial light allowed.	Nov 1 - March 15	
MO	Furbearer	No, though must hunt at night	None	Yes. No artificial light	Year-round	
MT	Predator	No	None	Yes. Artificial light allowed.	Year-round	
NE	Nongame	No	None	Yes. Artificial light allowed.	Year-round	
NV	Unprotected	No	None	By county. Artificial light allowed.	Year-round	
NH	Furbearer	No	None	Yes, from Jan-March. Artificial light allowed.	Varies by unit	
NJ	Samll game/Furbe	Varies	None	Yes, from Jan through Mar 25. Artificial light allowed.	Nov 15 - Mar 15	
NM	Unprotected	No	None	No	Year-round	
NY	Furbearer	Yes. Open: Oct 1 - March 26	None	Yes. Artificial light allowed.	Mid-Oct - mid Feb	
NC	Unprotected	No	None	Yes, in most counties. Artificial light allowed.	Varies	
ND	Furbearer	No	None	Yes, from end of November through Mid-March. Artifical	Year-round, but with a separate cable device season.	
OH	Furbearer	No	None	Yes. Artificial light allowed.	Year-round	
OK	Unprotected Furb	No	None	Yes. No artificial light	Year-round	
OR	Unprotected or Pı	No	None	Yes. Artificial light allowed.	Year-round	
PA	Furbearer	No	None	Yes. No artificial light	End of Oct - Mid Feb	
RI	Small Game	No except on public land (open	None	No	Year-round on private land; Nov-Jan on public land.	
SC	Unprotected	No	None	Yes. Artificial light allowed.	Dec - Feb	Legislatively-funded harvest 'incentive' program
SD	Predator	No	None	Yes. Artificial light allowed.	Year-round	
TN	Small Game	No	None		Year-round	
TX	Unprotected	No	None	Yes. Artificial light allowed.	Year-round	
UT	Predator	No	None	Yes. Artificial light allowed.	Year-round	$50 Bounty
VA	Furbearer	No except on department and l	None	No	Year-round	Bounties is some counties
VT	Furbearer	No	None	Yes. No artifical light.	Third weekend in Oct - Dec	
WA	Unclassified	No	None	Yes, except during rifle big game seasons. Artificial light a	Year-round	Foothold traps only legal for animal damage, by permit
WV	Unprotected	No	None	Yes,from Jan through July. Artificial light allowed.	Nov - Feb	
WI	Furbearer	No	None	Yes. Artificial light allowed.	Oct 15 - Feb 15	
WY	Predator	No	None	Yes. Artificial light allowed.	Year-round	

Summary	
No Closed Season	39
Minimal closed season	6
Established seasons	4
Established trapping seasons or re	25
Night Hunting	
Yearround	38
Established night seasons	9
Artifical light allowed, including re	35
Night hunting alllowed; no artificia	6
Night hunting Prohibited	11