New Hampshire
Wildlife Coalition

March 29, 2025

Dr. Stephanie Simek, Executive Director
New Hampshire Fish and Game Commissioners
NH Fish & Game Department
11 Hazen Dr.
Concord, NH 03301

RE: Comments 2025-2026 Biennial Rulemaking

Dear Director Simek and Commissioners:

In accordance with the announcement governing comments on biennial rulemaking we submit the following comments.

These comments are in three parts:

1) PART 1 - A review of the role of predators in New Hampshire's ecosystems and the need for biennial rules changes.
2) PART 2 – The scientific basis for our proposed rule changes.
3) PART 3 - Our proposal and rationale for biennial rules changes.
4) PART 4 - "Beyond Harvest and Catch per Unit Effort"- Recommendations for implementation of effort to provide additional lines of evidence to support New Hampshire furbearer management decision-making.

Respectfully submitted,

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for NH Wildlife Coalition

PART 1 - The Role of Predators in New Hampshire's Ecosystems

Predators play a crucial role in New Hampshire ecosystems and are an integral part in the dynamic balance and functioning of ecosystems. Their presence or absence can have significant effects on the overall health and stability of these ecosystems. Some of the ecosystem functions predators provide:

1) Regulation of prey populations: Predators help to control the populations of their prey species. By hunting and consuming herbivores, such as deer or rodents, predators help to prevent overgrazing or overpopulation of these prey species which helps to maintain a healthy balance between predators, prey, and the vegetation upon which their prey feeds. <u>Healthy forests need healthy predator populations</u>.

2) Biodiversity conservation: Predators play a critical role in maintaining biodiversity in New Hampshire ecosystems. They help to regulate the populations of various prey species, preventing any one species from dominating and outcompeting others. This promotes a diverse array of plant and animal species, which contributes to the overall health and resilience of the ecosystem.

3) Trophic cascade effects: Healthy predator populations can have cascading effects throughout the food web. These are known as trophic cascades. When predators are present in an ecosystem, their activities regulate the population sizes of their prey, which in turn can influence the populations of other species at lower trophic levels. For example, if the population of coyotes and bobcats, both apex predators in New Hampshire, declines, this can lead to an increase in the population of deer, their prey. This can then result in increased browsing pressure on vegetation, which can have cascading effects on plant communities, insects, and other animals that depend on those plants.

4) Control of zoonotic diseases: By preying on rodents, they can limit the spread of zoonotic diseases such as Lyme disease which can be transmitted from rodents to humans. By selectively targeting the sick or weak members of a prey population they can remove animals that are more likely to be disease carriers. This is especially critical in New Hampshire where Lyme disease and other tick- borne diseases are on the rise.

5) Strengthening genetic "health" of prey populations: By preying on the sick, weak and older members of a prey populations predators help strengthen the population's gene pool.

6) Ecosystem resilience: Predators help to maintain the resilience of ecosystems by regulating the populations of prey species. This helps ecosystems withstand disturbances such as climate change, disease outbreaks, or habitat loss.

7) Behavior modification: The presence of predators can also influence the behavior of prey species. Prey species may alter their feeding, mating, or movement behaviors in response to the possibility of predation. This can have indirect effects on ecosystem dynamics, such as influencing the distribution and abundance of certain plant species, which in turn can affect other species in the ecosystem.

In conclusion, healthy predator populations are essential components of New Hampshire ecosystems and NH Fish and Game efforts should prioritize maintaining healthy predator populations. Unfortunately, in New Hampshire, predators always seem to "bat last", i.e., less time and effort is spent on monitoring and understanding predator populations than on "game" populations. This is counterintuitive since the health of "game" populations is largely dependent on a healthy population of predators.

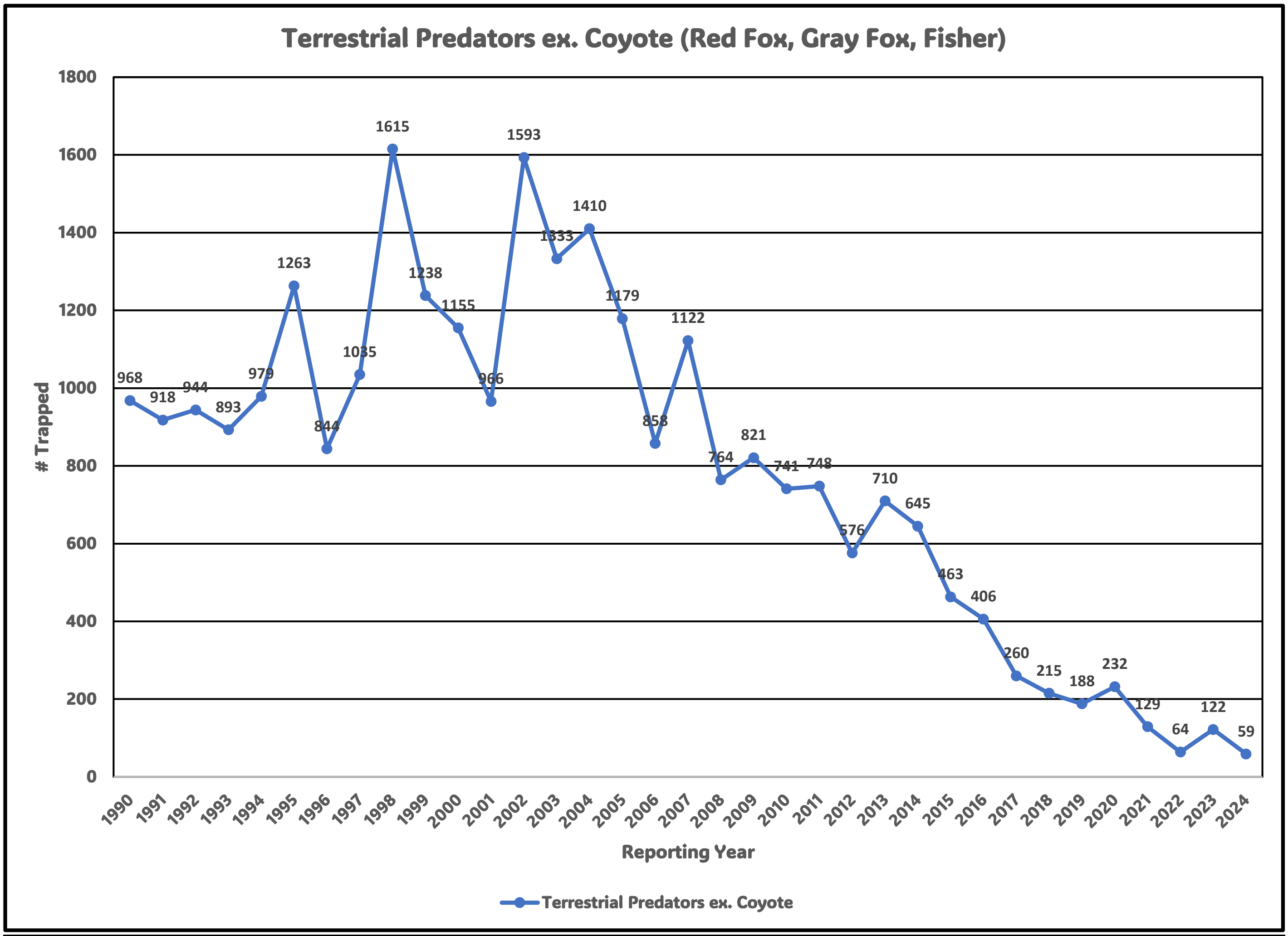
The sustainability of New Hampshire's game species populations, white-tailed deer, bear, turkey, etc. is testimony to focused management of these species. The harvest of these species is relatively constant year-to-year. In addition, New Hampshire's moose population, because it is significantly impacted by winter ticks, is closely monitored and decisions made annually to ensure a reasonably healthy population. These are examples of successful wildlife population management.

In contrast, the significant decline over the last 35 years in the harvest of all furbearer species except coyotes is testimony to ineffective management (See Table and chart below)[1]. Particularly disturbing is the significant decline in the harvest of the predominant terrestrial predators except for the coyote in the last 35 years

	Average Annual Harvest		
Species	**1990-2019**	**2020-2024**	**% change**
Beaver	**2917**	**1228**	**-58%**
Muskrat	**2168**	**315**	**-85%**
Otter	**280**	**97**	**-66%**
Mink	**351**	**39**	**-89%**
Raccoon	**546**	**187**	**-66%**
Coyote	**403**	**286**	**-29%**
Fisher	**492**	**25**	**-95%**
Gray Fox	**114**	**20**	**-82%**
Red Fox	**289**	**76**	**-74%**
# Trapping Licenses	**488**	**530***	**8.60%**

One species (Fisher) >90% decline
Three species (Muskrat, Mink and Gray Fox) > 80% decline
One species (Red Fox) > 70% decline
A total of 5 of 9 species >70% decline
* 2023 estimated at 528 licenses

[1] All data for these graphs and tables is NHFG data. Appendix A contains a synopsis of these data.



For three of the predator species, fisher, red fox and gray fox, catch per unit effort (CPUE) metrics also show a decline. Documentation of these declines will be presented in the following section.

While the magnitude of change may be somewhat different depending upon the method, both harvest metrics and CPUE conclude there is a significant change. The concurrence of these two lines of evidence should be a "wake up call" to implement some management action. <u>It should be noted that the threshold of change in harvest for other species, e.g., white-tailed deer and bear, that warrants management action is 12.5%.</u>

This leads us to our recommendations for changes in biennial rules affecting predator species.

PART 2 – The Scientific Basis for Our Proposed Rule Changes

New Hampshire Fish and Game is uniquely fortunate to possess an extensive and consistent database on harvest and Catch per Unit Effort (CPUE), with records dating back to at least 1990, and, for several species, as far back as 1922. Yet, despite this wealth of systematically collected data, our experience over the past six years has made one thing clear: rather than using this critical information as the foundation for decision-making, NH Fish and Game repeatedly finds ways to dismiss it in favor of anecdotal and subjective reasoning.

A stark example of this occurred during the 2023 biennial rulemaking presentation. Although fisher CPUE in the southern tier had declined by greater than 50% over the past 35 years, this data was effectively sidelined. Instead of confronting the concerning implications of this trend, decision-makers provided rationales for disregarding the evidence, shifting the discussion to other studies—some in progress, others merely planned—that might, hypothetically, produce different results. <u>This approach raises serious concerns about scientific integrity</u>. The public expects NH Fish and Game to adhere to sound, data-driven decision-making, yet we are seeing a troubling shift toward speculative reasoning and selective use of evidence.

This inconsistency is particularly glaring when contrasted with the Department's own statements regarding the reliability of trapping data. At a recent meeting (March 10, 2025), Chris Schadler of the New Hampshire Wildlife Coalition was told by NH Fish and Game wildlife biologists that trapping data (harvest and CPUE) <u>are not a reliable basis</u> for wildlife management decisions as these data did not represent trends in wildlife populations, rather that "hunter surveys" were more important. NH Fish and Game's reluctance to rely on its own trapping data is perplexing given its official stance, as outlined in the 2023 *New Hampshire Wildlife Summary* (p. 53):

> "*Under the guidelines of a carefully monitored program, regulated trapping assists with maintaining certain furbearer populations at desired biological and social levels. Data that trappers provide in mandatory trapping reports is used to track changes in furbearer distribution and abundance at both the management unit and statewide level.*
>
> *This information is essential for furbearer management decision making and is used by the Department's Game Management Team to develop management and harvest recommendations<u>**. New Hampshire's furbearer management program is data-driven and utilizes Catch Per Unit of Effort (CPUE) data as an index to population trends**</u>.*"

If NH Fish and Game itself acknowledges that CPUE data are "essential" for tracking population trends and making management decisions, then why are these same data so readily dismissed when they indicate a concerning decline in furbearer populations? The claim that declining harvests are due to "fewer trappers with lower success" , weather or "habitat changes", etc., or that hunter surveys were more reliable, has been repeated frequently, yet no objective data have ever been provided to support these assertions. The proper scientific approach to determining whether these other variables contradict traditionally relied-upon lines-of-evidence, i.e. trapping data, should follow a systematic, data-driven methodology, rather than just stated as an opinion supported by anecdotal information.

The suggestion that another variable that challenges traditionally relied-upon trapping data should be more heavily weighted must meet the **burden of proof** through rigorous scientific validation. Simply **hoping** that new data will be more useful or selectively **dismissing** long-standing, systematically collected data **is not a scientifically valid approach**. Decision-making should remain grounded in the best available evidence until superior, validated methodologies emerge.

The hope that future data sources might eventually prove useful cannot justify dismissing decades of rigorously collected CPUE and harvest data. Any attempt to do so undermines the very foundation of sound wildlife management and contradicts NH Fish and Game's own stated commitment to data-driven decision-making

PART 3 - Our Proposal for Changes in Wildlife Rules

We propose the following rule changes for the 2025-2026 biennium:

1) Closing the trapping and hunting season for fisher statewide.
2) Limiting the bag limit of red fox and gray fox to three per season, that limit to apply to both trapping and hunting with firearms, crossbow or bow and arrow.
3) Closing the firearms and bow and arrow coyote season from April 1 to August 31.
4) Requiring registration for the taking of furbearers (or at least red fox, gray fox and coyote) by firearms, or bow and arrow.

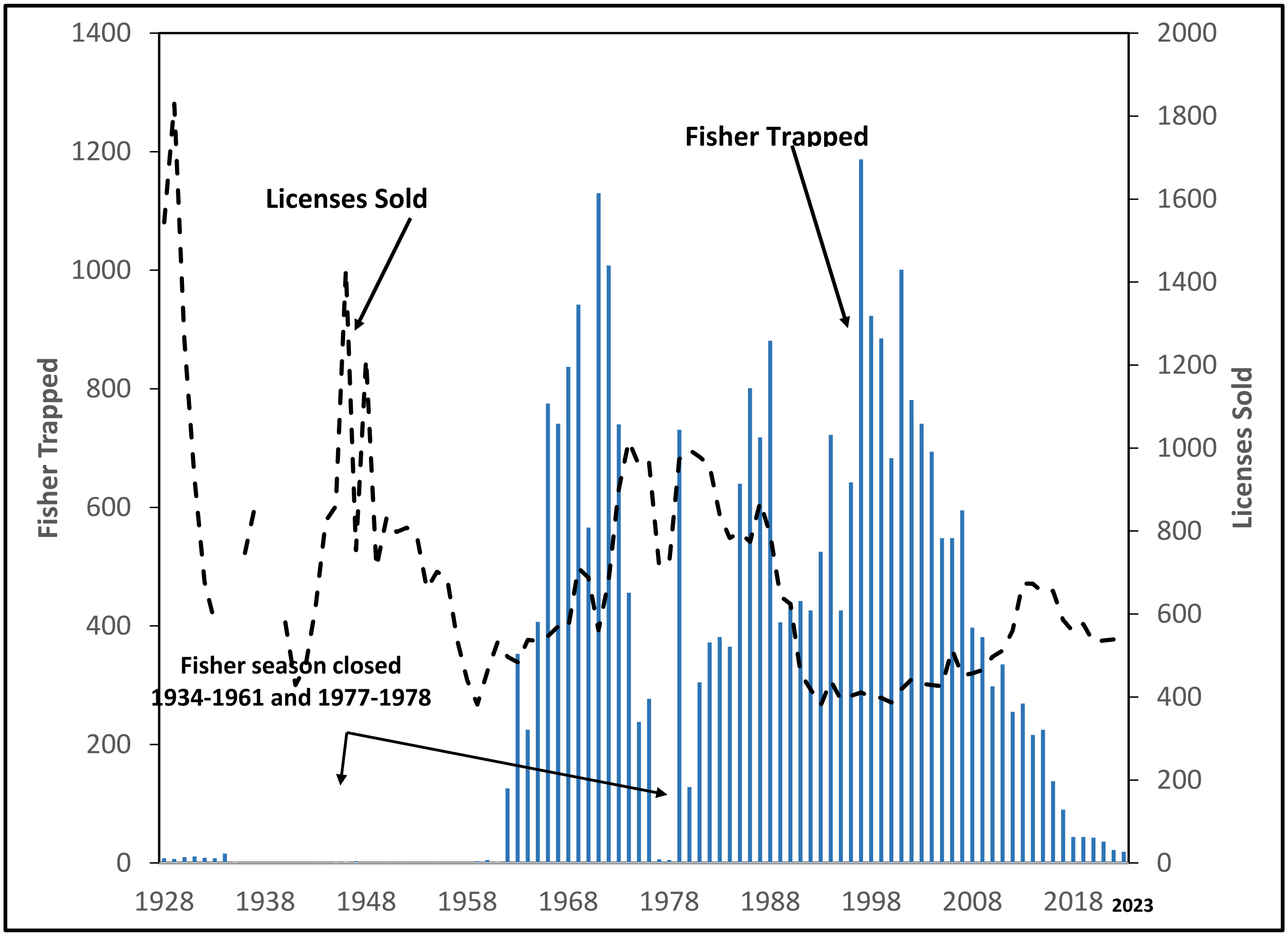
These proposals are made in recognition of the value of New Hampshire's predatory furbearers to New Hampshire's ecosystems and the fact that the current rules are based upon only a partial understanding of the abundance of these predatory species gained through trappers reports. Until a database can be established that provides a better estimate of TOTAL annual harvest of these predator species that includes those shot through their long seven-month or full year (coyote) open season, it is impossible to evaluate with any confidence the impact of current season lengths and bag limits on any of these populations.

PART 3A - The Case for Closing the Fisher Season

An analysis of trapping data for fisher supports a decision that the trapping and shooting seasons for fisher should be closed. This evidence includes:

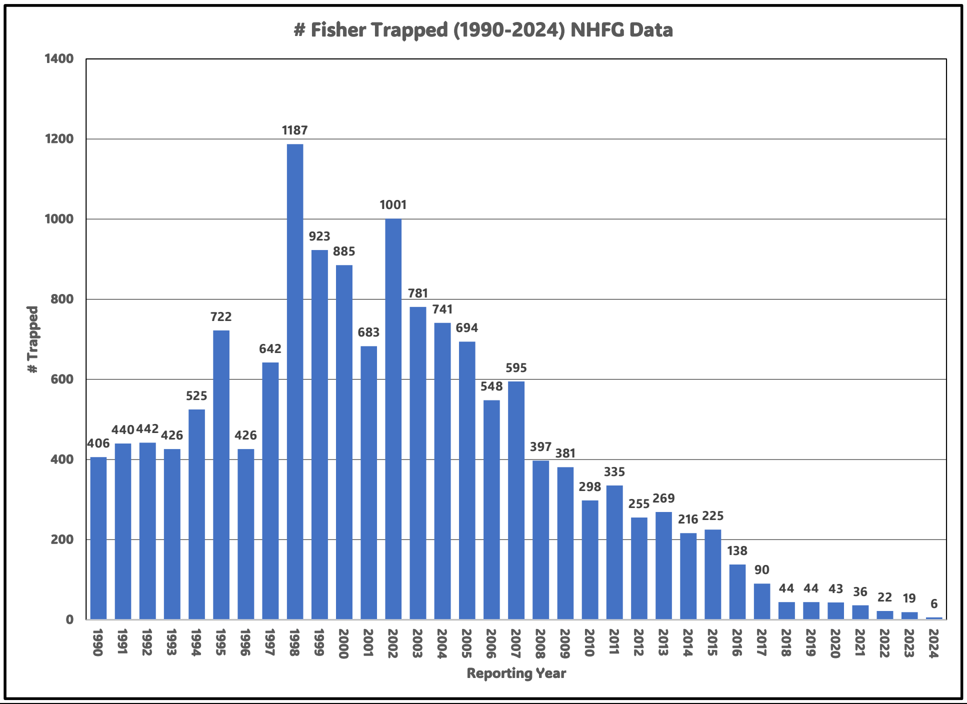
1) A significant decline in the number of fishers trapped over the last 35 years;
2) A significant decline in fisher Catch per Unit Effort (CPUE) over the last 35 years;

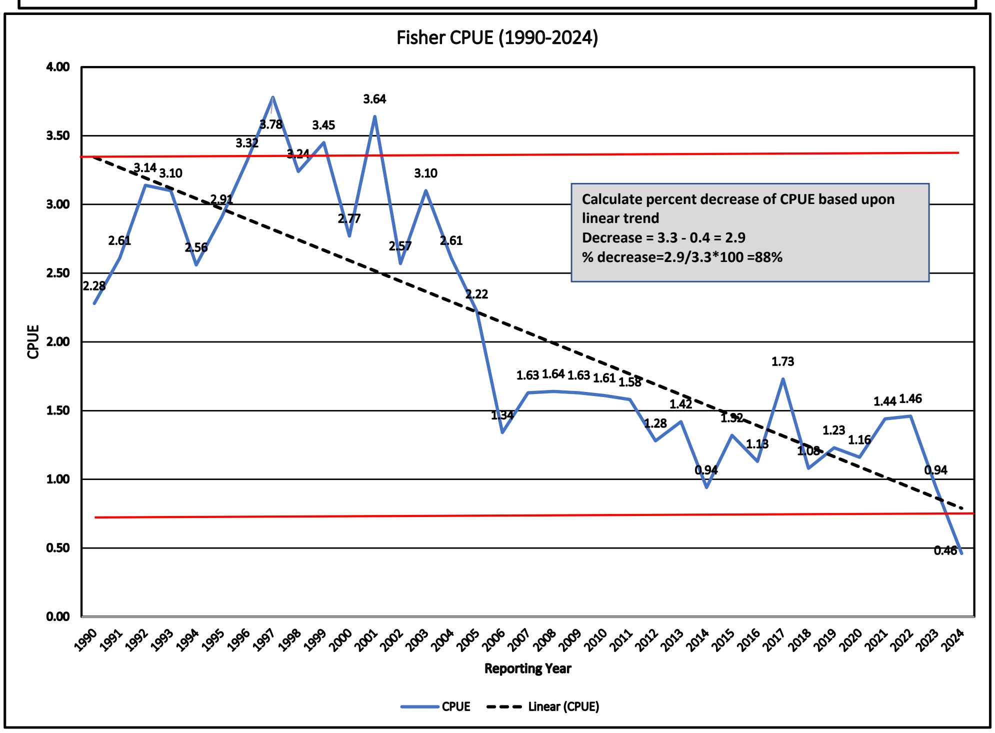
They say a picture is worth a thousand words. We believe the following chart of fisher harvest tells the story of the failure to manage a healthy, sustainable population of fisher as required by statute.



This chart of fisher harvest (total number trapped) from 1928 to the present reveals substantial variability which appears to have an inverse relationship to the number of trapping licenses. More importantly, these data show that the number of fishers was so low during two periods that the trapping season had to be closed. The fisher season was closed from 1934 until 1961. As the fisher population rebounded, the season reopened in 1961 and remained open until 1977 when it was closed again for two years.

Based upon NHFG trapping data, both CPUE as well as harvest of fisher has significantly decreased for the period 1990 through 2024[2]. Harvests declined from over 1100 in 1997 to only six statewide last year (**a 99% reduction!!**) and CPUE has declined an estimated 88% since 1990 based upon a linear trend analysis of annual data.





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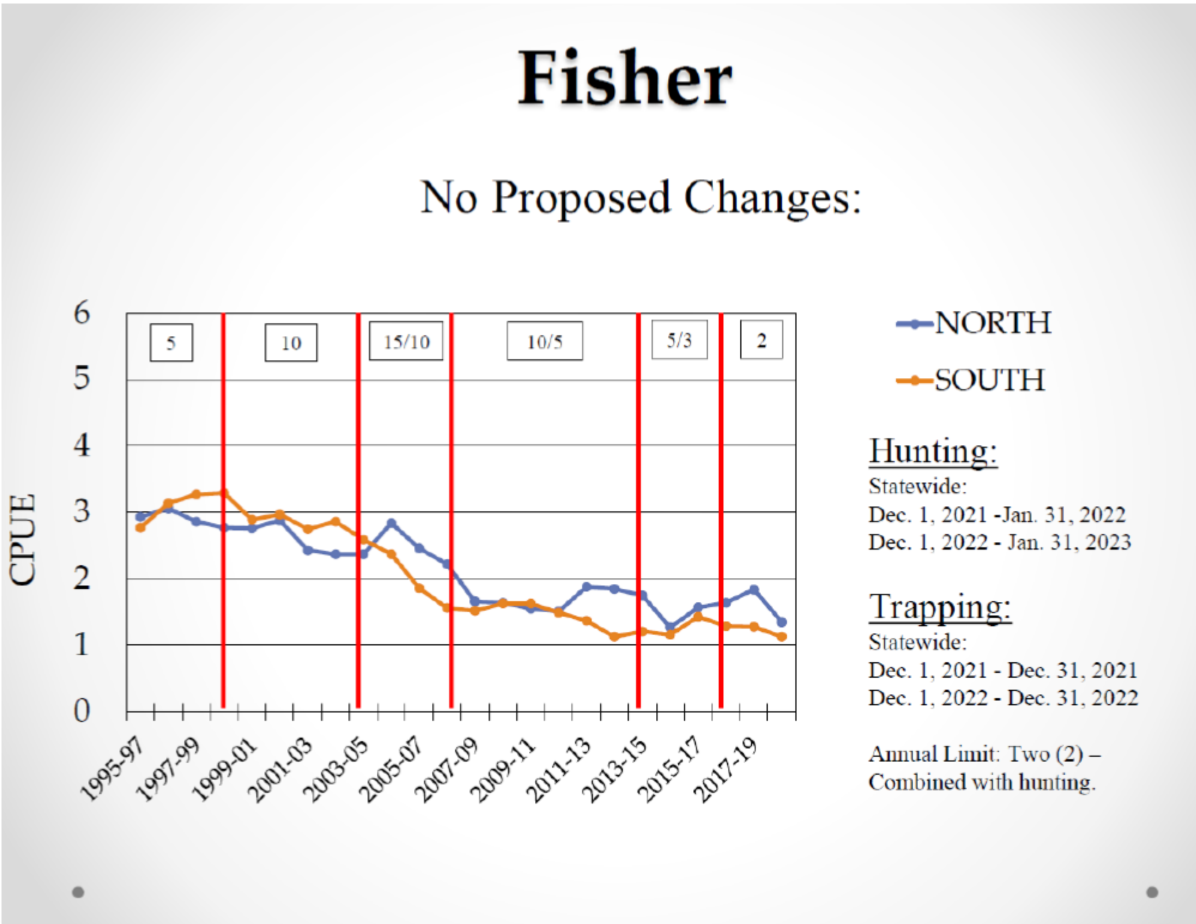
[2] Years are based upon the year reported.

These trends have continued despite efforts by NHFG to address them by reducing bag limits on several occasions over the last 35 years (see following figure). This is a clear indication that more drastic measures, such as a moratorium on trapping them, are necessary.

NH Fisher Bag Limits

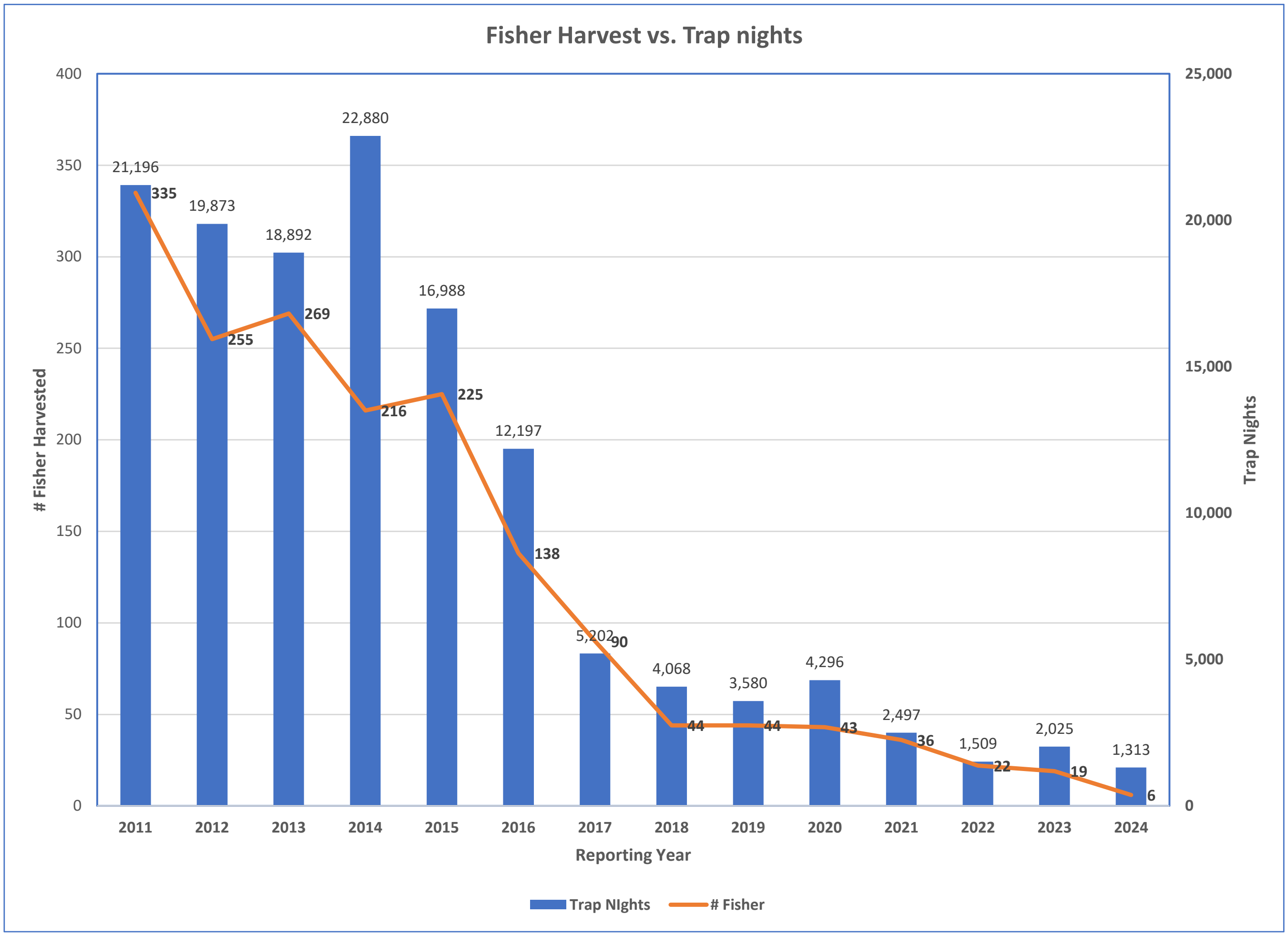


Of several factors that might explain the drastic decline in fisher metrics, trapping and rodenticides are perhaps the most likely.

A 6-year study in South Central Maine by the Maine Cooperative Research Unit utilizing 76 radio-collared fishers showed that where trapping is permitted, it is the major cause of fisher mortality--in that study, 80% of the fisher mortality was due to trapping (Krohn 1993).[3] Although trapping pressure on fisher based upon trap nights has declined over the last several years (see following figure), this low participation rate in trapping probably indicates that the fisher population is too sparse to sustain a productive trapping effort. Moreover, it should be noted that based upon trap nights there has been more than a 90% decline in fisher trapping effort in recent years. In my

[3] Krohn, W. 1993. "Do the Pieces Fit, Understanding a Harvested Fisher Population". Maine Fish & Wildlife Magazine Vol 35 No. 3.

opinion, this is a clear indication that the fisher population in New Hampshire has been significantly reduced due to overexploitation or other existential variables. This substantial decrease in effort is a direct consequence of the population no longer being able to support a higher level of harvest.



Another variable which may contribute to the apparent decline in fisher populations is the presence of elevated levels of rodenticides. New Hampshire's fishers exhibit some of the highest Second-Generation Anticoagulant Rodenticides (SGAR) body burdens in the nation (Buckley, et al. 2023)[4]. High levels of rodenticides in fishers have the potential to cause population-level effects, primarily due to direct toxicity and secondary consequences for survival and reproduction. Fishers are particularly susceptible to rodenticides because of their diet, foraging behavior, and the environments they inhabit. Studies, such as Gabriel et al. (2012)[5], have demonstrated that SGAR

[4] Buckley, J.Y., Needle, D.B., Royar, K., Cottrell, W., Tate, P. and Whittier, C., 2023. High prevalence of anticoagulant rodenticide exposure in New England Fishers (*Pekania pennanti*). Environmental Monitoring and Assessment, 195(11), p.1348.

[5] Gabriel, M.W., Woods, L.W., Poppenga, R., Sweitzer, R.A., Thompson, C., Matthews, S.M., Higley, J.M., Keller, S.M., Purcell, K., Barrett, R.H. and Wengert, G.M., 2012. Anticoagulant rodenticides on our public and

exposure, especially to multiple SGAR compounds such as are New Hampshire fishers, can lead to severe outcomes, including reproductive harm and mortality. Additionally, a robust body of research details the toxicological effects of SGARs on other small mammals, providing ample basis for concern.[6]

While, in the past, several other potential explanations for their apparent decline, including habitat loss, weather, etc., have been offered by NHFG, **trapping and hunting pressure are the only sources of mortality over which NHFG have some control, i.e. by closing seasons or adjusting bag limits.**

Finally, NHFG's argument that "regulated" trapping is the only viable means of assessing a predator population's health or population structure is deeply problematic. Following this reasoning to its logical conclusion, one could justify monitoring a population through its decline until it reaches critical levels—or worse, its extinction. Such an approach is not wildlife management; it is akin to passively observing a sinking ship rather than actively steering it to safety. Effective wildlife management requires proactive strategies that safeguard species before they reach precarious thresholds, not post-hoc assessments derived from unsustainable practices.

There are nonlethal methods of monitoring wildlife populations. The effort and resources expended in justifying continued trapping should be directed toward the development of innovative and humane alternatives. Modern wildlife management offers a variety of nonlethal tools, such as camera traps, genetic sampling, and telemetry, which are increasingly effective at providing robust population data without contributing to mortality. The ongoing UNH study is a good example of these approaches. Similarly, data on body burden of contaminants can be attained through roadkill, blood samples and hair samples, etc. Investing in optimizing these methods would demonstrate a commitment to science-based management that prioritizes both conservation and ethical stewardship.

Likewise, the argument that there are so few fishers trapped each year that it is comparable to having a closed season on fisher is purposefully misleading. By implying that this harvest level is negligible, NH Fish and Game ignores the disproportionate impacts that even modest harvests can have on localized populations, particularly in areas where fisher populations may already be struggling due to habitat fragmentation, rodenticide exposure, or other pressures. What data supports this claim? Is it based on robust population estimates derived from recent surveys, genetic studies, or other credible methods? Without clear evidence, this figure is speculative at best and misleading at worst.

Even if the annual harvest is a small percentage of the total population, its cumulative effects over time cannot be ignored, particularly when other threats are factored in. A "death by a thousand cuts" scenario could emerge if harvesting continues without safeguards or a clear understanding of the population's capacity to sustain these losses. Moreover, small, isolated fisher populations may

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community lands: spatial distribution of exposure and poisoning of a rare forest carnivore. *PloS one*, *7*(7), p.e40163.

[6] There is a substantial literature base on effects of SGARs. This can be provided if necessary.

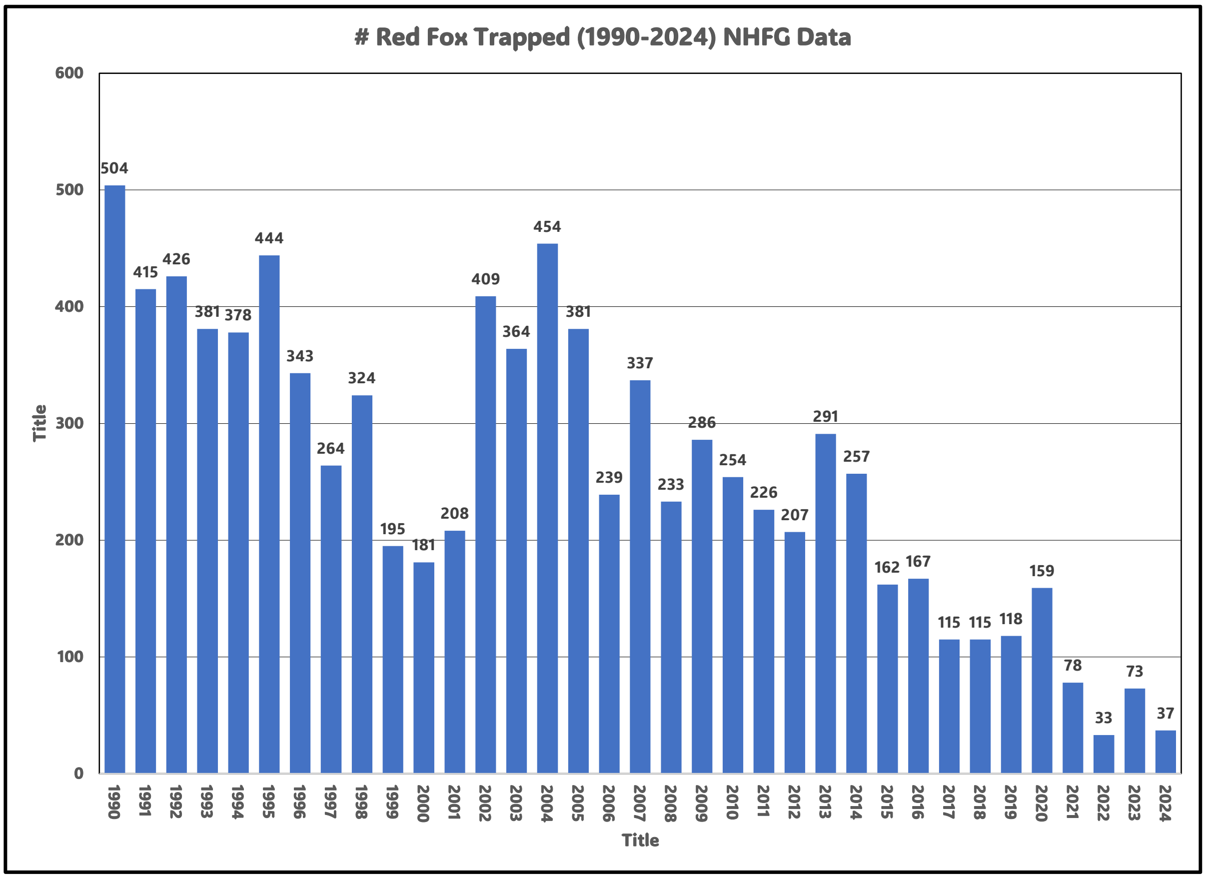
be disproportionately affected, as they lack the genetic diversity and resilience of larger, contiguous populations.

By relying on oversimplifications and unsubstantiated claims, NH Fish and Game risks alienating those who value science-driven conservation. Fisher populations face numerous challenges, and managing them effectively requires honesty, precision, and a commitment to rigorous scientific inquiry. Anything less undermines the credibility of wildlife management in Vermont.

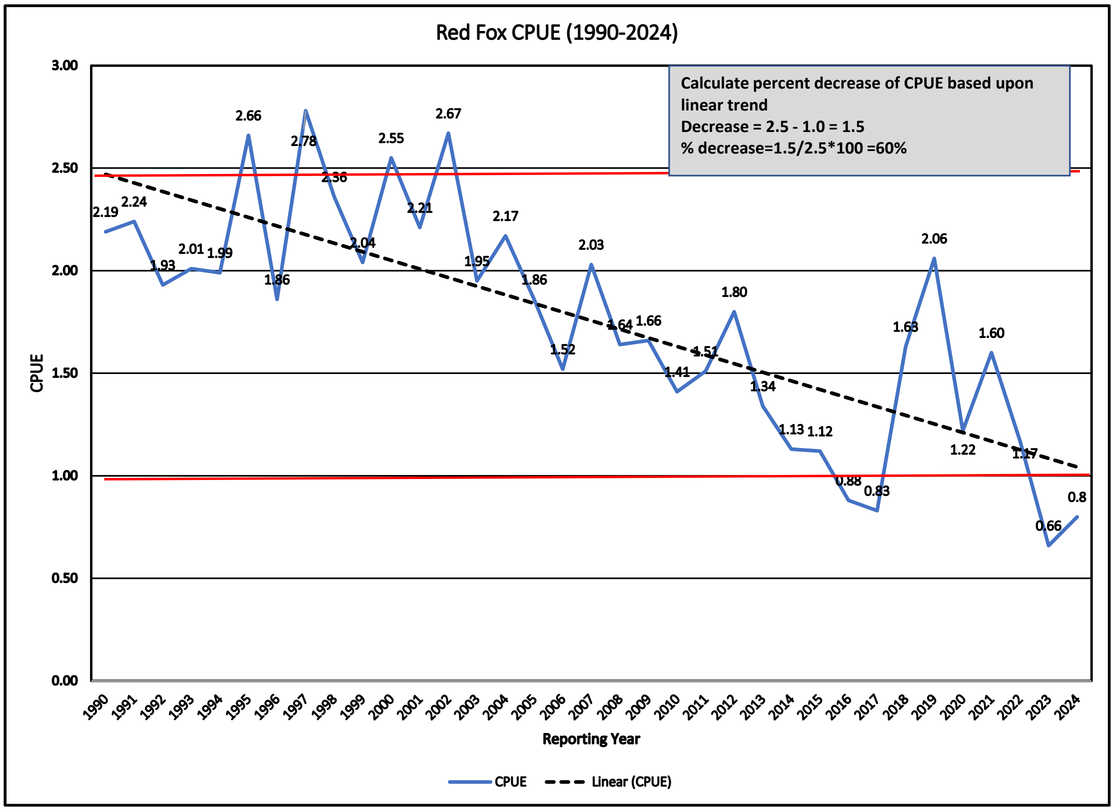
PART 3B - The Case for Establishing Bag Limits for Red and Gray Fox

Based upon the significant decline in both harvest and CPUE for red and gray foxes, we recommend that the bag limits for both fox species be established at three of each species statewide and season long, that limit to apply to both trapping and hunting with firearms, crossbow or bow and arrow.

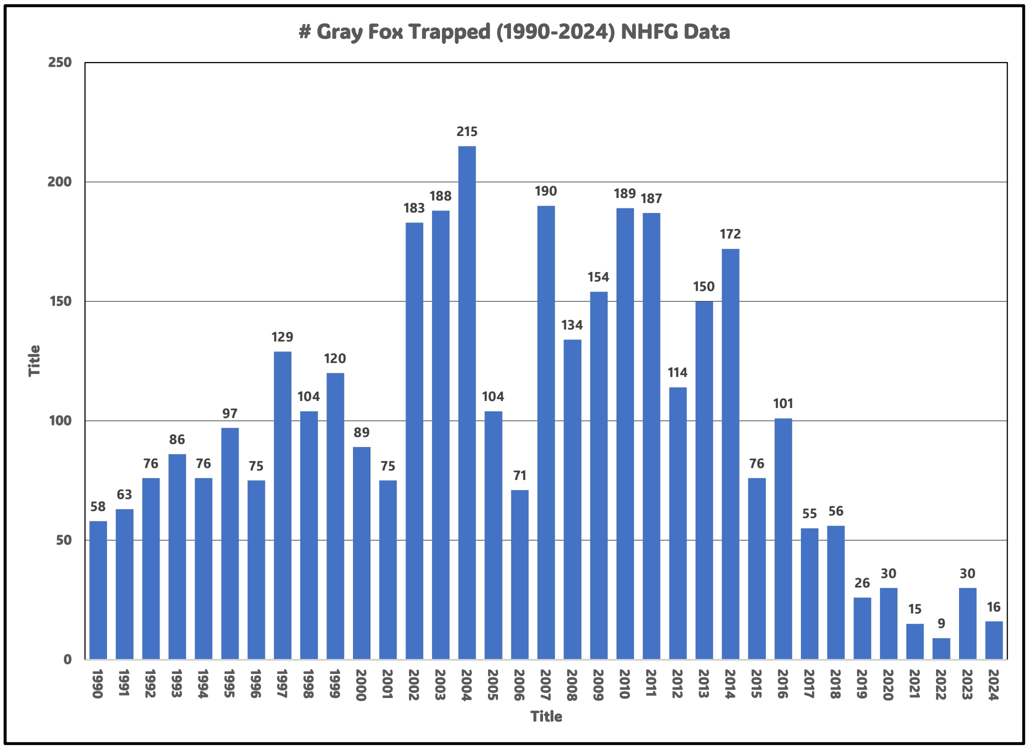
The following charts show the trend in harvest and CPUE for each species. There has been a 74% decrease in the annual average harvest of red foxes for the 30-year period of 1990-2019 compared to the annual average harvest in the last five years 2020-2024.

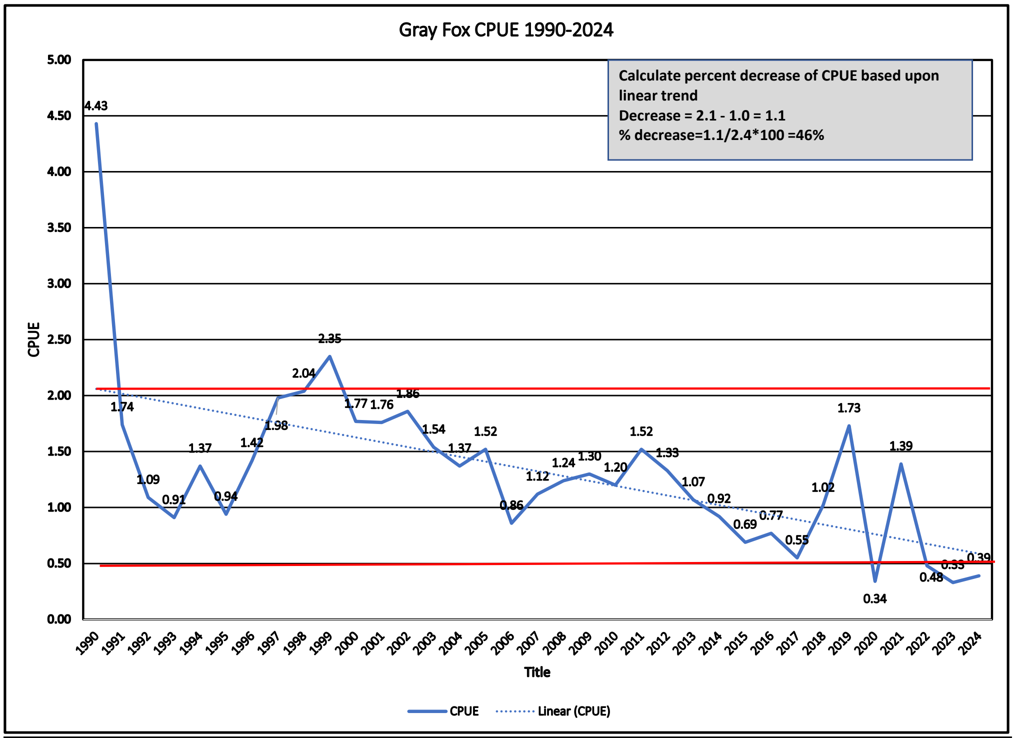


Based upon linear trend analysis, there has been an approximate 60% decrease in CPUE for red fox since 1990.



There has been an 82% decrease in average annual harvest of gray foxes for the 30-year period of 1990-2019 compared to the last five years 2020-2024. Based upon a linear trend analysis, there has been an approximate 75% decrease in CPUE since 1990.





While these furbearing carnivores are critical to a healthy ecosystem, historically (1800s and early 1900s) these species have been considered nuisances, or "varmints," and killed on sight, with many having bounties put on them. Unfortunately, this "varmint" paradigm – the perception of predators as nuisances – apparently persists among some of the Commissioners. I say this because it is clear both from the long seasons and the absence of bag limits on these species compared to game species. There is no plausible reason to allow these species to be shot for the seven-month season other than to provide disposable live targets to those who consider this a form of recreation. <u>During that time as many can be killed as wanted and there is no duty to report if (or how many) you kill</u>.

The only other rationale would be to kill these foxes for their fur. While that may have been a justification a few decades ago, provided, of course, that the shooter properly placed the shot, this is hardly the case now as fox pelts sold for generally less than $20 at this year's auction.

Some of us who have been around for a while will remember that during the 2019 biennial rulemaking NHFG Department biologists proposed a three-fox bag limit to address this significant decline. However, the Commission declined to endorse the limit on fox trapping and hunting proposed by the agency staff and rejected their recommendation.

By not decreasing the bag limits for these species, it was apparent that the Commission gave no consideration to the fact that the significant decreases in populations of furbearing predators such as the fox species also have extensive negative consequences to the ecosystem. With fewer predators, lower trophic level species such as rodents (mice, voles and moles), chipmunks, squirrels and groundhogs, etc., can experience dramatic population increases which also potentially increases the incidence of infectious diseases, like Lyme. <u>It is not unreasonable for NH residents to expect that those charged with conservation, protection, and management of wildlife populations and habitats [RSA 206:4-a(I)] to have an elementary understanding of predator-prey dynamics and ecosystem health.</u>

PART 3C - Furbearer Registration

We enthusiastically support the new draft rule Fis 303.14 requiring registration of any furbearer taken by hunting within 24 hours of taking. We also recommend that the registration form includes a requirement that any coyote 50lbs or greater be reported. The reason: Similarity of appearance between eastern coyote and the returning eastern wolf endangers the wolf's recovery in the northeast.

The absence of specific permits or tags to shoot furbearers with a firearm or bow and arrow is unique for wildlife managed by New Hampshire Fish and Game. Presently there are no requirements for reporting the take of furbearers during their respective firearms and bow and arrow hunting seasons. This contrasts with the detailed requirements for trappers to report any furbearers taken by trapping (Fis 303.08 – Annual Trappers Report). In addition to the reporting requirements for trappers who take furbearers, New Hampshire Fish and Game requires that hunters report their take of moose, whitetail deer, bear, turkey and small game (voluntary).

The complete absence of any mandatory reporting of furbearers taken by firearms or bow and arrow is remarkable because they are the <u>ONLY</u> category of New Hampshire's wildlife for which New Hampshire Fish and Game allows <u>unlimited take by firearms and bow and arrow</u> (except for fishers which have a bag limit of two) with no requirement for reporting their take (See Exhibit 2).

The public has the expectation that rules governing the management of its public trust resources are consistent. Having reporting requirements for take of furbearers by trap and other game species, including moose, whitetail deer, bear, turkey and small game (voluntary) by firearms or bow and arrow and not having rules governing take of furbearers by firearms or bow and arrow is arbitrary and lacks any scientific basis.

It is time to change the paradigm for managing furbearers from managing them as "varmints" is NOW and we hope that the proposed draft rules Fis 303.14 Furbearer Registration is adopted!

PART 3D- The case for closing firearms and bow and arrow coyote season from April 1 – August 31

This proposed rule option challenges the current management paradigm of a continual open season Since other furbearers are granted a reprieve to whelp their young, a consistent bias is evident in management decisions regarding the coyote.

Unlike other NH predator species whose numbers are in decline based upon trapping records, coyotes numbers appear to be stable. This is purely an assumption, however, because no serious studies of coyote abundance have been conducted in New Hampshire or even the Northeast. Assumptions have always been the 'go to' for managing this species – for example, the ability of coyotes to respond reproductively when their numbers begin to decline have led to the assumption that year-round hunting will not negatively affect the population. But could this assumption overlook the role family plays in controlling population growth, not to mention the effect on ecosystems of which they play an important role?

New Hampshire has never adopted a clear goal for the management of the coyote – would the ideal be fewer coyotes or a stable population at current levels? The best way to manage this species is not to manage at all. The historic bias toward managing through killing has always held sway, and yet since it's appearance in 1944, its numbers have grown to reach all corners of our state. There is far more evidence today (Crabtree, et al. 1999[7], and recently, Mol, et al., 2024[8]) that indiscriminate hunting can result in not fewer but more coyotes. If left alone, coyote populations stabilize; when exploited, such as during whelping, the family fragments and young are more likely to become problematic

Our proposal to close coyote hunting from April 1st through August 31st addresses the issue of taking coyotes during denning. There is clear evidence that removing a parent, particularly a dominant male upon whom the female relies for food during denning, can result in loss of a litter, or if the female is taken as well, starvation for the pups.

Studies have shown that adult coyotes do train their young in their choice of prey and other food. This training process is an essential part of coyote parenting and is crucial for the survival of young coyotes, as it prepares them for independent hunting and helps them develop the skills necessary to thrive in their environment.

Young coyotes with limited parental guidance are more likely to prey on livestock and domestic animals. This increased probability is due to several factors:

1. Lack of proper hunting skills: Adult coyotes typically train their young on prey selection and hunting techniques. Without this guidance, young coyotes may not develop the necessary skills to hunt wild prey effectively, leading them to target easier prey like livestock and domestic animals.

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[7] Crabtree, R.L. and Sheldon, J.W., 1999. The ecological role of coyotes on Yellowstone's northern range. *Yellowstone Science*, *7*(2), pp.15-23.

[8] Moll, R.J., Green, A.M., Allen, M.L. and Kays, R., 2025. People or predators? Comparing habitat-dependent effects of hunting and large carnivores on the abundance of North America's top mesocarnivore. *Ecography*, *2025*(1), p.e07390.

2. Insufficient knowledge of food sources: Coyote parents teach their offspring about various food sources, including small rodents, rabbits, insects, and fruits. Without this education, young coyotes may struggle to find appropriate natural food sources and turn to livestock or domestic animals as an alternative.
3. Reduced fear of humans: Adult coyotes usually teach their young to avoid human-populated areas. Orphaned or abandoned coyotes may lack this caution, making them more likely to approach farms and residential areas where livestock and pets are present.
4. Missed opportunities for behavior correction: Coyote parents often correct their puppies' behavior after they get into potentially dangerous situations. Without this correction, young coyotes may not learn to avoid risky encounters with humans or their animals.
5. Lack of territorial awareness: Adult coyotes establish and defend territories, which helps regulate population density and resource use. Young coyotes without parental guidance may not understand territorial boundaries, leading them to wander into areas with higher concentrations of livestock.
6. Increased desperation for food: Young coyotes without parents to provide food may become more desperate and willing to take risks, including targeting livestock and pets as easy food sources.

In summary, a five-month hiatus in coyote hunting during their breeding and pup-rearing season could allow young coyotes to benefit from essential parental training, potentially leading to fewer human-coyote conflicts as they grow into adulthood.

PART 4 - Beyond Harvest and Catch per Unit Effort

We fully support efforts to collect additional data on predatory furbearers to supplement trapping data, and the 2023 biennial rulemaking hearings introduced discussions on using "secondary indices" for species such as coyote, red fox, and gray fox. The proposed supplementary data sources include:

1) Spring Turkey Survey
2) Fall Archery Hunter Survey

These additional datasets may prove valuable, provided they are conducted annually with consistent protocols. However, after reviewing the first three years of survey results, it is clear these surveys show little variability, meaning it will take several more years before their sensitivity to actual population changes can be assessed.

NH Fish and Game must exercise caution: until these supplementary indices have been validated—meaning they must demonstrably track the same trends that harvest and CPUE data reveal—they remain unreliable as a basis for decision-making. At this stage, they cannot be considered a legitimate "secondary index," nor can they be used to challenge the conclusions drawn from the existing dataset on trapper harvest and CPUE.

<u>UNH Monitoring Study</u>

The UNH monitoring study is an ambitious effort and, as I mentioned at the 2023 biennial rulemaking hearing when the study was introduced, if continued for several years and in several different habitats, can provide useful information. One of New Hampshire Wildlife Coalition's scientists attended a recent public presentation on this monitoring study and provided a critical review of the study. That review is summarized here:

> *In summary, the results of the study could be used to provide annual estimates of the statewide or WMU densities and abundance of managed furbearers and be useful in describing inter-annual trends if the design is repeated consistently over sufficient generation times (years) for the mammal species of interest. However, it is very clear to me that the results of this study will not provide reliable estimates of population abundance or density (i.e., the number of each mammal species of interest present in each WMU or statewide during each period monitored) as stated in the study objectives (Objective 1) <u>without additional work to address the inherent assumptions of the statistical model and methods</u>.*
>
> *The most obvious assumption made and not tested is that the population of each wildlife species of interest detected (sampled) by the cameras in this study is "closed" with respect to immigration and emigration into and out of the study area. Simply put, the sampling design, NEST model, and its variance estimator only provides accurate population abundance or density estimates if there is no movement by the target species into or out of the study area (e.g., camera cluster or WMU) during the sampling interval.*

> *… at best, this camera trap design provides unadjusted estimates of detections per unit area that could be biased high by multiple detections (counts) of the same individual. Furthermore, the investigators indicated that the camera clusters were not truly random, because they avoided placing cameras on game trails, footpaths, and in wetlands. Game trails exist because they are frequently traveled by one or more furbearers and footpaths are commonly traveled by many of these furbearer species. Therefore, by eliminating a randomly selected camera location if it viewed a game trail or footpath and moving that location elsewhere, a true random allocation of camera sites was not sampled, with the result being an underestimate of the number of detections. Likewise, the perimeter of wetlands is often traveled by these furbearers, again biasing the number of detections downward by not allowing a game camera to be placed there if the random point fell there. By violating the randomness assumption of camera placement there is no way of knowing if the number of camera detections per unit area from this study is biased high, low, or not at all.*

These are but a few of the shortcomings of this study which will need to be addressed in future years of conducting the study. Until these shortcomings are addressed, the results of this monitoring survey cannot be used as a supplemental line of evidence with which to evaluate relative changes in the populations of any of the targeted species.

NH Fish and Game should also be aware that <u>before</u> an index of abundance, such as would result from the camera trap study, can be used to make quantitative assessments of population trends, <u>it must first be calibrated</u>, ideally, against an absolute measure of abundance. Since absolute measures of abundance are generally not practical for furbearers, an alternative option is to calibrate two indices of abundance against one another, for example the trapping results and the camera trap results. A strong concordance between the two indices indicates that they can be considered reliable reflections of actual abundance, particularly if the association is maintained in a variety of habitats.

Based upon my 40-years' experience peer reviewing proposed studies such as the camera trap study, I estimate it would be at least five years before there would be sufficient time-series data to make it a useful line of evidence. In addition, it would have to be continued at a relatively high cost to NHFG.

Other programs which could be implemented which have the potential to provide data that would be useful in supplementing the trapping data at a low cost are:

1) Monitoring roadkill, and
2) Requiring mandatory tags (or permits) and reporting of furbearing predators shot with firearms, crossbow or bow and arrow.

<u>Roadkill Monitoring</u>

Although there are some roadkill data collected by NHFG, there does not appear to be any consistent protocol for collecting these data and the data are limited to only a few species. Although I've heard it mentioned that these data are evidence or corroboration of "trends", there is no way unless the data are collected following the same protocols from year to year and place to place that this conclusion would stand up to scientific scrutiny.

I have commented at public meetings on how systematically collecting roadkill data could be used as a line of evidence to supplement the trapping data. Once a roadkill monitoring program is set up it could be continued at very little cost to the Department and, in my opinion, would have a greater probability of providing useful data in a shorter time than the turkey and bowhunter surveys or even the camera trap study. Many states in the region are now employing smart phone applications developed for the purpose that the public can use to report roadkill to NH Fish and Game.

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Appendix A-1. Harvest 1990-2024 (NH Fish and Game Data)

Season (Reporting Year)[1]	Beaver	Muskrat	Otter	Mink	Raccoon	Coyote	Fisher	Gray Fox	Red Fox
1990	3098	3764	329	465	890	169	406	58	504
1991	2589	2381	261	358	796	155	440	63	415
1992	3372	3886	316	537	965	227	442	76	426
1993	2059	2525	285	381	854	260	426	86	381
1994	3612	2273	405	441	994	298	525	76	378
1995	5901	4389	504	513	888	342	722	97	444
1996	4048	2731	317	386	902	380	426	75	343
1997	4752	2976	451	587	519	345	642	129	264
1998	3980	3980	344	429	684	398	1187	104	324
1999	3784	3517	288	453	923	318	923	120	195
2000	3412	1714	291	416	374	279	885	89	181
2001	2879	2169	244	262	244	358	683	75	208
2002	4313	3577	386	616	555	556	1001	183	409
2003	2280	1458	275	367	415	532	781	188	364
2004	2626	1495	321	304	433	654	741	215	454
2005	2366	2118	279	314	55	622	694	104	381
2006	3057	2109	367	292	350	464	548	71	239
2007	3377	2651	345	449	495	560	595	190	337
2008	2270	1587	214	477	557	416	397	134	233
2009	2756	1170	209	277	362	505	381	154	286
2010	2603	1736	240	253	409	426	298	189	254
2011	2337	1272	214	332	524	401	335	187	226
2012	3229	1698	344	247	347	410	255	114	207
2013	2484	1800	285	385	571	509	269	150	291
2014	2324	1658	241	281	577	485	216	172	257
2015	2044	1383	166	257	454	434	225	76	162
2016	2244	1432	163	170	434	500	138	101	167
2017	1202	547	146	110	321	383	90	55	115
2018	1140	500	82	87	230	390	44	56	115
2019	1371	557	95	75	249	299	44	26	118
2020	1318	363	119	33	177	364	43	30	159
2021	1167	402	98	68	190	409	36	15	78
2022	1248	333	111	40	191	281	22	9	33
2023	1300	225	100	35	255	214	19	30	73
2024	1109	251	55	17	124	160	6	16	37
Total per species since 1990	93,651	66,627	309	10,714	17,308	13,503	14,885	3,513	9058

Appendix A-2. CPUE 1990-2024 (NH Fish and Game Data)

Season (Reporting Year)	Beaver	Muskrat	Otter	Mink	Raccoon	Coyote	Fisher	Gray Fox	Red Fox
1990	5.90	7.96	3.39	1.16	18.04	1.15	2.28	4.43	2.19
1991	7.33	10.80	2.39	1.58	17.58	1.36	2.61	1.74	2.24
1992	6.51	7.34	2.08	1.21	24.94	1.64	3.14	1.09	1.93
1993	9.74	7.69	2.06	1.32	19.21	1.76	3.10	0.91	2.01
1994	6.58	6.92	1.43	1.01	20.91	1.81	2.56	1.37	1.99
1995	7.91	6.90	2.02	1.76	14.40	1.18	2.91	0.94	2.66
1996	7.66	6.73	2.21	1.75	26.50	1.83	3.32	1.42	1.86
1997	8.51	10.20	2.29	1.77	24.50	3.00	3.78	1.98	2.78
1998	7.04	7.90	1.19	2.40	30.60	2.32	3.24	2.04	2.36
1999	9.28	11.20	2.81	4.20	8.22	2.01	3.45	2.35	2.04
2000	9.87	10.10	2.28	2.72	3.62	1.34	2.77	1.77	2.55
2001	8.85	7.97	1.60	1.68	3.87	2.47	3.64	1.76	2.21
2002	9.99	8.97	2.12	2.25	3.97	2.86	2.57	1.86	2.67
2003	8.55	8.91	2.15	1.85	3.16	2.26	3.10	1.54	1.95
2004	8.82	10.60	2.33	1.73	3.38	1.68	2.61	1.37	2.17
2005	8.97	10.60	1.76	2.19	2.57	1.85	2.22	1.52	1.86
2006	6.38	7.76	1.58	2.07	2.46	1.77	1.34	0.86	1.52
2007	7.31	5.41	1.58	1.30	1.78	2.77	1.63	1.12	2.03
2008	8.82	7.28	2.11	2.64	3.17	2.30	1.64	1.24	1.64
2009	7.52	5.87	1.63	2.08	2.67	2.30	1.63	1.30	1.66
2010	7.62	6.24	2.48	2.07	3.57	2.00	1.61	1.20	1.41
2011	8.82	5.73	1.97	2.08	3.18	1.92	1.58	1.52	1.51
2012	6.86	5.64	1.55	1.99	3.07	2.40	1.28	1.33	1.80
2013	5.29	4.85	1.26	1.43	2.49	1.46	1.42	1.07	1.34
2014	5.96	5.07	1.55	1.09	2.72	1.21	0.94	0.92	1.13
2015	5.52	4.70	1.96	1.91	2.20	1.21	1.32	0.69	1.12
2016	4.71	5.31	1.46	1.47	3.41	1.06	1.13	0.77	0.88
2017	7.23	5.70	2.77	1.57	1.62	1.41	1.73	0.55	0.83
2018	6.92	6.53	1.65	1.75	3.68	1.52	1.08	1.02	1.63
2019	8.89	6.78	3.15	2.05	2.95	2.17	1.23	1.73	2.06
2020	5.92	5.87	1.94	1.14	1.76	1.14	1.16	0.34	1.22
2021	5.54	10.18	3.07	1.50	2.78	1.79	1.44	1.39	1.60
2022	7.48	6.41	2.58	1.49	2.77	1.98	1.46	0.48	1.17
2023	7.89	5.45	2.83	1.52	4.3	1.55	0.94	0.33	0.66
2024	5.79	10.24	2.82	0.87	3.25	1.86	0.46	0.39	0.8