

NEW YORK STATE | Department of Environmental Conservation

Management Plan for Bobcat in New York State

2024–2033

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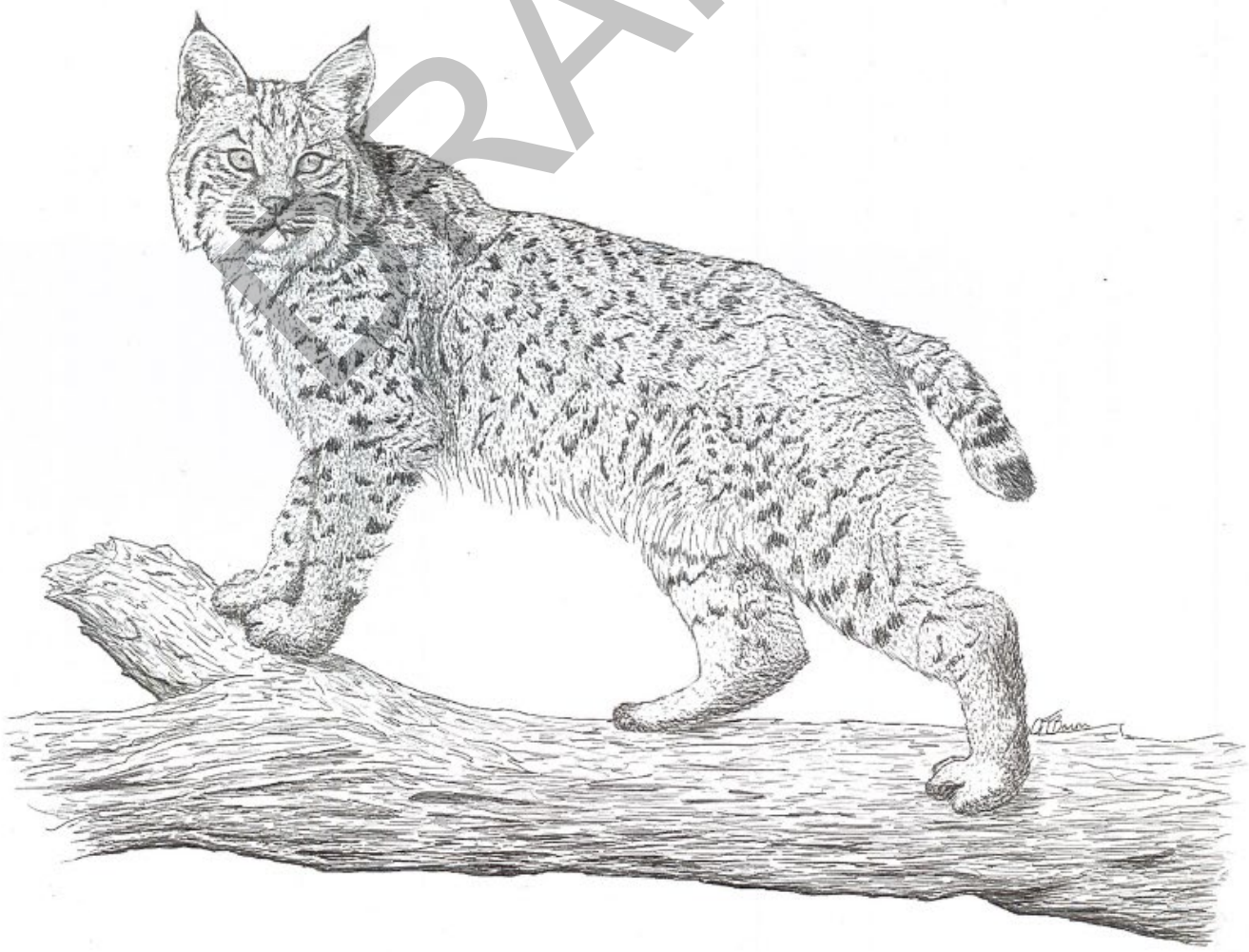
Kathy Hochul, Governor | Basil Seggos, Commissioner



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Director, Division of Fish and Wildlife

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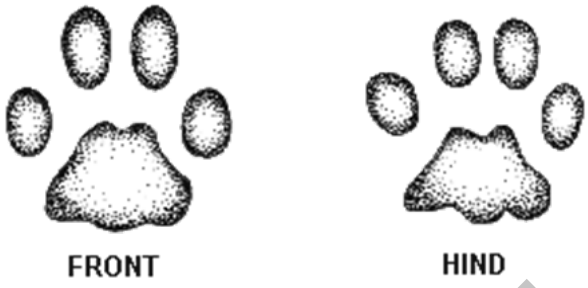

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Goals of the Bureau of Wildlife

Goal 1. Ensure populations of all wildlife in New York are of the appropriate size to meet all the demands placed upon them.

Goal 2. Ensure DEC meets the public desire for: information about wildlife and its conservation, use, and enjoyment; understanding the relationships among wildlife, humans, and the environment; and clearly listening to what the public tell DEC.

Goal 3. Ensure DEC provides sustainable uses of New York's wildlife for an informed public.

Goal 4. Minimize the damage and nuisance caused by wildlife and wildlife uses.

Goal 5. Foster and maintain an organization that efficiently achieves our goals.

Acknowledgments

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EXECUTIVE SUMMARY

The bobcat (*Lynx rufus*) is a medium-sized member of the cat family, Felidae. Once found throughout New York State, bobcats were considered a pest species and heavily persecuted until the 1970s, when they were designated a small game species by the New York State Legislature. By that time, bobcats were largely restricted to the Taconic, Catskill, and Adirondack mountains. In 1976, the Department of Environmental Conservation (DEC) established highly regulated hunting and trapping seasons in northern and southeastern New York. Under careful management, the bobcat population began to expand outside of their core range. By 2012, observation data indicated that bobcat populations in portions of central and western New York had grown substantially and could sustain a limited harvest. DEC subsequently adopted the first *Management Plan for Bobcat in New York State*, which expanded harvest opportunities for bobcats by extending the season in portions of northern New York and opening a restricted season in the southern tier and Rockland and Westchester counties for the first time since 1976.

Since adoption of the first *Management Plan for Bobcat in New York State* in 2012 and subsequent expansion of harvest opportunities in portions of New York, DEC has focused on improving our understanding of bobcat populations through the collection of additional harvest and observation data. These harvest- and non-harvest-based indices indicate that bobcat populations remain stable to increasing throughout most of the state. However, more work is needed in specific wildlife management unit aggregates where larger sample sizes will improve confidence in the observed trends. Harvest-independent data would better facilitate evaluation of bobcat populations in the Population Growth Area. In this area, reported bobcat sightings have increased substantially over the past decade, but DEC lacks a standardized approach to appropriately evaluate the population and establish criteria for harvest management.

This second edition plan serves as an update to the existing plan and outlines strategies to continue assessment of bobcat harvest trends and population indices while providing recommendations for future bobcat management in New York. This plan advances three goals for managing bobcat populations in New York that are closely aligned with the goals of DEC's Bureau of Wildlife.

> **Goal 1: Maintain or enhance bobcat populations in all areas of the state where suitable habitat exists.**
>
> **Goal 2: Provide for the sustainable use and enjoyment of bobcats by the public.**
>
> **Goal 3. Ensure that DEC is meeting the public desire for information about bobcats and their conservation, use, and enjoyment.**

These goals underscore our responsibilities to ensure the conservation and sustainable use of bobcat populations as a public trust resource in New York. To accomplish these goals, DEC defines a number of objectives and strategies to guide the bobcat management program into the future. Several of these objectives and strategies are a continuation from the 2012–2017 *Management Plan for Bobcat in New York State*, while others are new for this plan.

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Strategies continuing from the 2012–2017 Management Plan for Bobcat in New York State include:

- Continue DEC's pelt sealing program to track bobcat harvest and collect harvest and demographic information through furbearer possession tags.
- Annually estimate observation density of bobcats in New York through sightings reported in the Trapper Survey and Bowhunter Sighting Log.
- Annually estimate trapper take-per-unit-effort for bobcat through the Trapper Survey.
- Monitor bobcat distribution through public sightings reported via the Furbearer Sighting Survey or to DEC Wildlife staff.
- Conduct outreach to increase public understanding, appreciation, and support of bobcats as a sustainable wildlife resource.
- Compile information on bobcat-human interactions in the Wildlife Damage Database and developing guidelines for dealing with nuisance animals and avoiding human-bobcat conflicts.

Strategies new to this plan include:

- Develop a harvest-independent survey to estimate bobcat occupancy and abundance throughout New York.
- Develop a population model to annually estimate population trends by wildlife management unit aggregate.
- Develop a periodic survey of bobcat hunters and trappers to better understand harvest methods, take-per-unit-effort, and hunter/trapper satisfaction with existing bobcat seasons.
- Establish criteria for modifying existing harvest opportunities or opening new areas to bobcat harvest.
- Collect bobcat carcasses throughout New York for three years to estimate demographics of harvested bobcat populations.
- Assess public values and attitudes concerning bobcat management.

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1.0 INTRODUCTION

1.1 Summary of Accomplishments from 2012–2017 *Management Plan for Bobcat in New York State*

Goal: Maintain or enhance secure, viable populations of bobcats, where suitable habitat exists, and provide sustainable benefits for the people of the state.

The Furbearer and Small Game Mammal Team, comprised of New York State Department of Environmental Conservation (DEC) biologists and technicians tasked with managing New York's furbearer species, was responsible for carrying out the tasks outlined in the previous management plan. To achieve this goal, two primary objectives were identified; below is a summary of each.

Objective 1: Maintain or enhance bobcat populations in all areas of the state where suitable habitat exists.

- Delineated the state into four different bobcat management zones to better meet differing management objectives: Established Harvest Area (formerly referred to as the "Current Harvest Area"), Harvest Expansion Area, Population Growth Area, and the No Bobcat Area.
- Monitored bobcat harvest trends through mandatory pelt sealing and collection of Furbearer Possession Tags.
- Collected canine teeth from harvested bobcats in the Harvest Expansion Area and determined age structure of this population to evaluate the population trend and growth rate in this region from 2013–2015 (based on methods described by Roberts 2010).
- Collected take-per-unit-effort data for 2013–2015 from the submission of mandatory activity logs completed by bobcat trappers and hunters. Take-per-unit-effort data were used as an index of abundance.
- Developed a matrix model to estimate survival and reproductive rates of bobcats based on sex and age structure of the harvested population. This model can be used to evaluate the population-level impacts of adjusting the harvest structure.
- Annually estimated statewide bobcat take-per-unit effort from 2015–2021 using the New York State Trapper Survey and the Small Game Hunter Survey.
- Annually collected statewide bobcat observation data through the Trapper Survey and the Bowhunter Sighting Log.
- Created and maintained the online Furbearer Sighting Survey, where the public can submit sightings of bobcats along with photographs for confirmation.

Objective 2. Provide for sustainable use and enjoyment of bobcats by the public.

- Established a uniform, equitable, and sustainable harvest opportunity (October 25th to February 15th) for hunters and trappers throughout the Established Harvest Area.
    - Extended the close of bobcat trapping season from Dec. 10th to February 15th in the Northern Adirondacks, Central Adirondacks, Champlain Valley and Transition, St. Lawrence Valley, and East Ontario Plain Wildlife Management Unit Aggregates (WMUAs) to be concurrent with bobcat hunting season.
    - Extended the bobcat trapping and hunting seasons from Dec. 10th until February 15th in the Central Tug Hill WMUA.

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- Established a limited hunting and trapping season in the Harvest Expansion Area (Oct. 25th through the Friday before regular Southern Zone big game season).
- Added bobcats to the DEC-managed Wildlife Damage Database to better track bobcat-human conflicts.
- Surveyed 4,500 trappers and furbearer hunters to evaluate season date preferences for bobcats and other furbearers.
- Encouraged and promoted the use of "Best Management Practices for Trapping Bobcat in the United States" (AFWA 2020) and maintained an updated version of this document on the Department website. Trapping Best Management Practices (BMPs) are scientifically- researched recommendations for traps and trapping systems used to capture furbearers in the United States. The purpose of the BMP program is to improve regulated trapping by evaluating trapping devices and techniques used for the capture of furbearers and educating those who use traps about the most humane, safe, selective, efficient and practical devices.
- Maintained a bobcat species profile on the Department's public website.

1.2 Purpose and Need of Updated Management Plan

Bobcats are a charismatic species that are highly valued by many different groups in New York, including trappers, hunters, photographers, and wildlife enthusiasts. It is necessary to closely monitor bobcat harvest to ensure sustainable populations that can be enjoyed by both consumptive and non-consumptive users in New York for generations to come.

Section 11-0303 of New York's Environmental Conservation Law directs DEC to develop and carry out programs that promote the maintenance of desirable species in ecological balance, with due consideration of ecological factors, the importance of fish and wildlife resources for recreational purposes, and public safety. This plan documents and describes the goals, objectives, and strategies that will guide DEC's actions and decisions related to management of bobcat populations in New York in accordance with this legal mandate over the next 10 years.

Since adoption of the first *Management Plan for Bobcat in New York State* in 2012 and subsequent creation of the bobcat HEA, harvest- and non-harvest-based indices indicate that bobcat populations remain stable to increasing throughout most of the state. This second edition plan outlines strategies to continue assessment of bobcat harvest trends and population indices within the HEA and provides recommendations for future bobcat management in New York.

2.0 BIOLOGY AND ECOLOGY OF BOBCATS

2.1 Physical Characteristics, Distribution, and Ecology

The bobcat is a North American member of the cat family Felidae. The species is currently found throughout New York State, except for New York City and Long Island. Through the 1900s, their core population was found in the Taconic, Catskill, and Adirondack mountains; however, starting in the 1990s, bobcat populations began increasing and expanding throughout central and western New York. Legally, bobcats are defined as a protected, small game species under the New York State Environmental Conservation Law (ECL) 11-0103(2)(c). Bobcats also are currently listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as species having the potential to be overharvested

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because of their similarity in appearance to species classified as endangered or threatened anywhere in the world.

Physical Characteristics

Bobcats are medium-sized cats with a gray to brown coat, whiskered face, and black-tufted ears. They are smaller in stature than the Canada lynx (*Lynx canadensis)* but are about twice as large as the domestic cat. Bobcats have distinctive black bars on their forelegs, white spots on the back of their ears, and a black-tipped, 5-6-inch-long tail from which they derive their name. Bobcats are known by many for their spotted coat; however, the degree of spotting is highly variable throughout their range. In New York, most bobcats have faint or indistinct spots. Males are larger than females, with males averaging 21 pounds and females averaging 14 pounds. However, large individuals of either sex can exceed 30 pounds. Average body length is 34 inches for males and 30 inches for females.

Geographic Distribution

Bobcats are widely distributed throughout North America, ranging from southern Canada south to central Mexico. Bobcats were historically found in all 48 contiguous US states (Young 1958), although their populations declined following European settlement due to unregulated taking and conversion of habitat to agricultural uses (Deems and Pursley 1978). Recent trends suggest that bobcats are increasing in distribution and abundance throughout their range (Roberts and Crimmins 2010), though their distribution remains restricted in the central Midwest, where intensive agriculture limits recolonization (Hughes et al. 2019).

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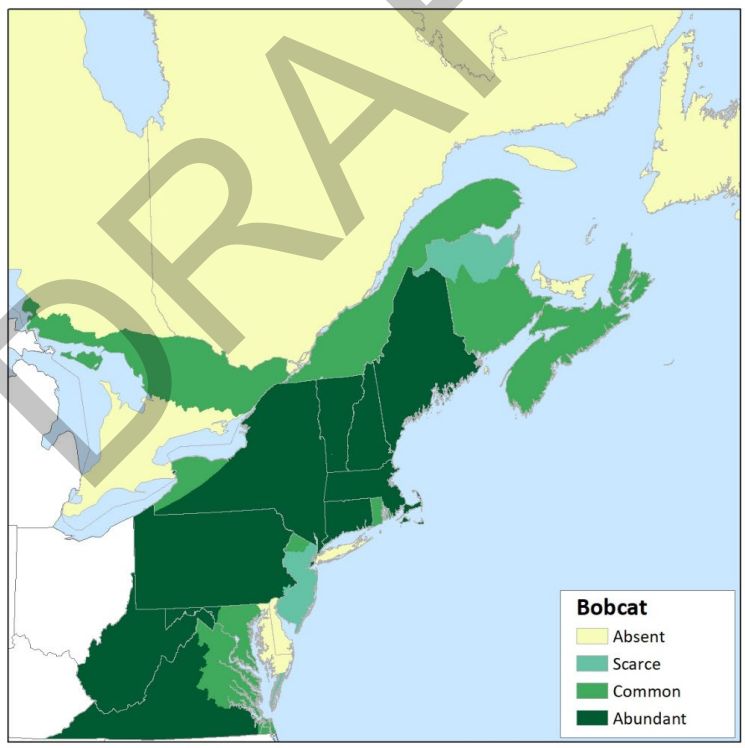

Figure 1. Northeastern range of the bobcat, as developed by the Northeast Fur Resources Technical Committee (2019).

It is presumed that bobcats were distributed throughout New York when the state was first settled. As land was converted to agricultural uses and bobcats were treated as a pest species, their distribution and abundance in the state declined significantly (Fox and Brocke 1983). Long

Island had enough bobcats to warrant the enactment of a bounty in the mid-1700s (Connor 1971); however, bobcats were extirpated from the area by the mid-1800s (DeKay 1842). A similar trend was observed in western New York, with bobcats having disappeared from the area by the mid-1800s (Severinghaus and Brown 1956). Bobcats were historically rare in the Adirondacks, likely because of the severe winters of this area (Merriam 1882). However, Merrill (1899) stated that the Adirondacks became a holdout for bobcats in the late 1800s, noting that the bobcat had been largely extirpated from New York with the exception of the "wilder parts of the Adirondacks, the Catskills, and the Hudson Highlands."

Research into the distribution of the bobcat in New York conducted from 1977–1982 found a similar bobcat distribution as that described in 1899, with bobcats confined to less than 15,000 mi^2 across the Adirondack, Catskill, and Taconic regions. However, since that time, bobcat distribution has expanded dramatically across the state. By the 1990s, there were documented bobcat sightings in central and western New York (Brown et al. 1995) and by 2013 the population was established enough to open a limited harvest season in portions of this area (NYSDEC 2012). Today, despite their secretive nature and inconspicuousness, bobcats have been observed across the entire state, except New York City and Long Island (NYSDEC, unpublished data).

Habitat Ecology

Bobcats are habitat generalists and occupy a wide range of habitats in North America. In the United States, they can be found in chaparral and rimrock areas in the west, arid deserts in the southwest, tropical swamps and bottomland forests in the southeast, and northern boreal forests in the northern part of the country. Bobcats have been documented using agricultural areas (NYSDEC 2012); however, they avoid areas of intensive agriculture (Lovallo 1999; Nielson and Woolf 2002; Tucker et al. 2010). Rocky terrain interspersed with areas of dense cover appear to be important to bobcats throughout their range (Erickson 1955; Young 1958; Zezulak and Schwab 1979; Karpowitz 1981). In northern states, coniferous forests seem to be important to bobcats (McCord 1974; Fuller et al. 1985; Lovallo and Anderson 1996a).

Within New York, bobcats have been found using a wide range of habitats, from agriculture to brushland to mature softwood or hardwood stands (Fox and Brocke 1983). Fox and Brocke (1983) examined habitat relations of bobcats in four study areas in the Adirondacks and Catskills. While radio-collared bobcats did use certain habitats more often than expected based on availability, habitat use varied widely by individual, even within the same study areas (Fox and Brocke

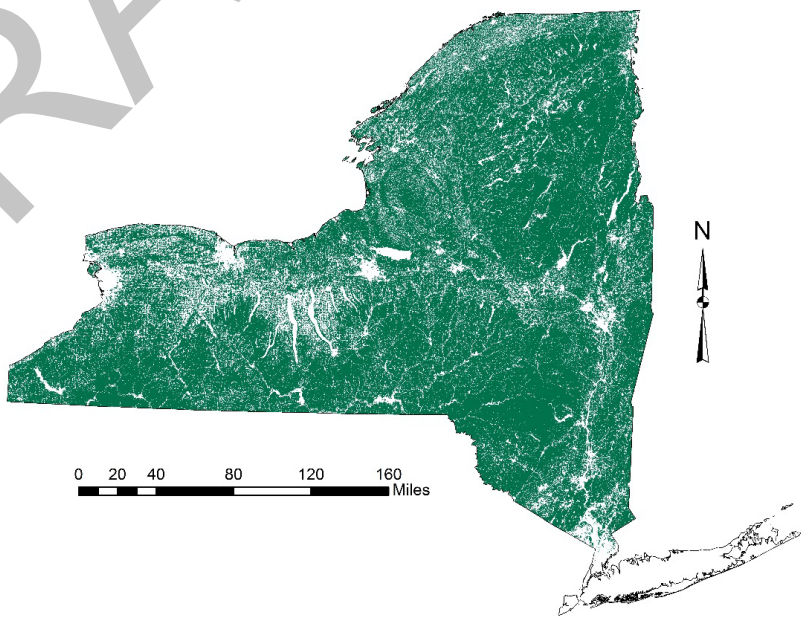

Figure 2. Suitable bobcat habitat (green) in New York as predicted by a wildlife habitat response model developed by the New York Gap Analysis Project (Smith et al. 2001). Note that while some regions may have suitable bobcat habitat, this map does not reflect variability in abundance related to differences in habitat quantity and quality across the state.

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1983). In general, bobcats appear to select for lower elevation areas within their home ranges and are more likely to select for coniferous forests during the winter season (Fox and Brocke 1983).

Average home range size of bobcats varies widely between areas in New York. Bobcats in the Adirondacks have significantly larger home ranges than bobcats in the Catskills. Fox and Brocke (1983) found that male bobcats in the Adirondacks had average home range sizes 9 times larger than those in the Catskills, with Adirondack females using home ranges 2.5 times larger than Catskill females. Female bobcats typically use smaller home ranges than males (Fox and Brocke 1983; Lovallo 1999). It has been suggested that females use higher quality habitat with better prey availability to meet energetic demands associated with rearing kittens (Bailey 1981; Hamilton 1982).

Habitat selection of bobcats appears to be driven by a number of factors. Prey availability is important, as is dense cover for both hunting and escape (Erickson 1955; Bailey 1974; Knowles 1985). Availability of denning sites and protection from severe weather also play a role (Pollack 1951; Erickson 1955; Bailey 1974). Bobcats are poorly adapted to deep snow conditions; winter severity likely limits their abundance in some parts of northern New York (NYSDEC 2012) and possibly the snow belt of Western New York.

Foraging Ecology

Bobcats typically occur as solitary predators. They are opportunistic feeders, feeding primarily on abundant mammalian prey ranging in size from mice and voles to deer. Bobcats will also occasionally feed on ground-nesting birds, reptiles, amphibians, invertebrates, and carrion. While rabbits and hares make up a significant portion of the bobcat diet throughout their range, studies have documented shifts in diet to other small mammals and birds following declines in lagomorph (rabbit and hare) abundance, illustrating the opportunistic nature of these felids (Bailey 1981; Knick 1990; Maehr and Brady 1986).

In one New York study, deer and rabbits were the main diet components, occurring in 32% and 30% of sampled bobcat stomachs, respectively (Fox and Brocke 1983). Mice and voles were present in about a quarter of bobcats sampled but accounted for only 3% of the stomach contents by weight (Fox 1990). There were no sex- or age-related differences in diet documented (Fox and Brocke 1983; Fox 1990).

Deer are an important food source for bobcats, particularly in winter when they are more vulnerable to predation. Fox and Brocke (1983) found evidence suggesting that bobcats in the Adirondack region of New York (where bobcats were stressed by long, severe winters) that preyed on deer and/or fed on deer carcasses were more likely to survive than those that did not. Of the 17 deer carcasses visited by transmittered bobcats during this study, the majority were young deer (10 were young of the year and 1 was a yearling; Fox and Brocke 1983). Seven of these were killed by bobcats (approximately 40% of the carcasses visited; Fox and Brocke 1983).

Reproduction

Bobcats are polygamous, and most breeding occurs in February and March, though they are capable of breeding any time of the year (Duke 1945; Young 1958; Gashwiler et al. 1961; Fritts 1973; Crowe 1975). Females reach sexual maturity in their first year of life, though they seldom successfully reproduce (Crowe 1975; Rolley 1985). Yearling reproduction occurs to some extent, but yearlings have lower pregnancy rates and smaller estimated litter sizes than adults

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(Crowe 1975; Knick et al. 1985; Anderson 1987; Stys and Leopold 1993). Male bobcats reach sexual maturity their second winter. Both males and females are reproductively active until death (Crowe 1975).

Bobcats typically have one litter per year, though females are seasonally polyestrous and can cycle again if a litter is lost (Crowe 1975; Stys and Leopold 1993). Fox and Brocke (1983) found an average litter size of 2.5 kittens for New York bobcats. Litter size varied with age, with animals over 3 years of age producing larger litters (Fox and Brocke 1983). A range-wide analysis found that average litter size and pregnancy rates may be related to prey availability and bobcat population density, with higher rates of pregnancy when population density is lower (Lembeck and Gould 1979; Knick 1990).

Females give birth in dens, typically located in caves, rock crevices, hollow logs, or brush piles. Bobcats have also been observed denning in abandoned buildings and structures (Bailey 1974). Females will move dens multiple times while raising kittens (Bailey 1979). Bobcat kittens will begin leaving the den around one month of age (Stys and Leopold 1993) and will often remain in their natal home range into their first winter (Fox and Brocke 1983).

Survival and Mortality

The majority of bobcat mortalities are human-related. In areas with bobcat hunting and trapping seasons, harvest is the primary cause of death (Berg 1979; Hamilton 1982; Fuller et al. 1985; Rolley 1985; Fuller et al. 1995). Adult survival rates in unharvested populations are generally greater than 80% (Crowe 1975; Nielson and Woolf 2002). Survival rates are significantly lower in harvested populations; Fuller et al. (1995) documented annual survival rates of 49% in a heavily exploited population of bobcats in Massachusetts. Even within regions with closed hunting and trapping seasons, the majority of bobcat deaths are related to human activities (e.g., incidental harvest, vehicle collisions; Nielsen and Wolf 2002).

Bobcats have few natural predators; though coyotes appear to prey on kittens and juveniles with some regularity (Young 1958; Knick 1990; Fedriani et al. 2000). There have also been reports of coyotes killing adult bobcats (Gipson and Kamler 2002). Juvenile bobcats are occasionally taken by fisher (Gilbert 2001) and even other bobcats (Zezulak 1981; Litvaitis et al. 1982). In some areas, domestic dogs may contribute significantly to bobcat mortality (Lembeck 1986; Knick 1990).

Bobcats can be infected with a wide range of diseases and parasites, though their impacts on bobcat populations are poorly understood. Diseases documented in bobcats include rabies, feline panleukopenia, feline leukemia, feline infectious peritonitis, sylvatic plague, tularemia, brucellosis, bobcat fever (*Cytauxzoon felis*), and toxoplasmosis.

Bobcat carcasses are collected by DEC staff whenever possible. When the cause of death is not obvious, carcasses are submitted to the Department's Wildlife Health Program to conduct necropsies and determine cause of death (see Appendix II). A review of 73 bobcats submitted to the Wildlife Health Program since 2013 found that the vast majority of mortalities were directly related to humans (60% were hit by vehicles and 16% were due to legal or illegal hunting/trapping activities). Eight bobcats tested positive for rabies. The main source of natural mortality for submitted bobcats was starvation (starvation was the primary cause of death for 6% of submitted bobcats). Due to concerns about the potential impact of anticoagulant rodenticides on wildlife like bobcats and fishers that prey on small mammals (Van den Brink et al. 2018), the Wildlife Health Program's partners at Cornell University's Animal Health

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Diagnostic Center are opportunistically screening furbearer carcasses submitted to their lab to better understand the scope of this issue in New York.

2.2 Harvest Management in New York

Prior to the mid-1970s, bobcats were considered a pest species in New York. They were unprotected throughout the state and could be taken at any time by any method without limits. Certain county governments paid bounties on bobcats as recently as 1971. As public opinion began to shift in the 1970s to place more value on predators, New York's State Legislature enacted a law prohibiting the paying of bounties by government entities and classified bobcat as small game in 1976. With the reclassification of the species, DEC was authorized to set seasons and bag limits by regulation. The first regulated hunting and trapping season for bobcats in eastern New York was established by DEC in 1976–1977. At that time, in central and western New York where bobcats were absent or populations were not well established, there were no hunting or trapping seasons.

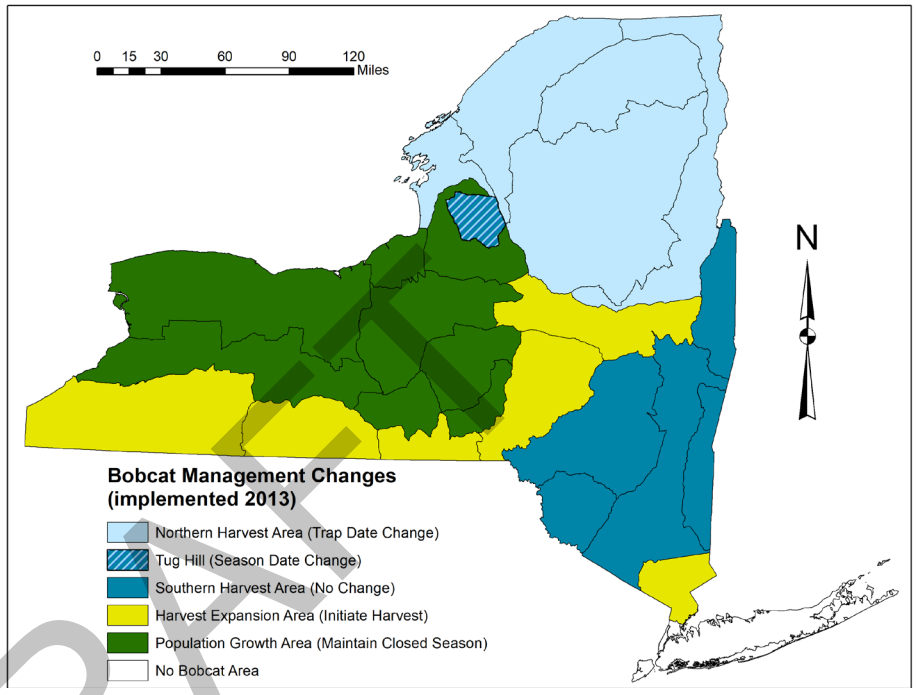

Figure 3. Changes to bobcat seasons in different bobcat management zones. These changes were proposed as part of DEC's 2012–2017 Management Plan for Bobcat in New York State and implemented in the 2013 hunting and trapping seasons. The "Established Harvest Area" (EHA) includes the Southeast and Northern Harvest areas and the Tug Hill.

Beginning in 1977, DEC required that all bobcats harvested during hunting or trapping seasons be pelt-sealed (a tag affixed to the pelt by DEC personnel). This allowed the agency to better track the impacts of hunting and trapping on bobcat populations and also ensured compliance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which listed bobcats under Appendix II in February 1977. Appendix II species are those identified as having the potential to be overharvested because of their similarity in appearance to species classified as endangered or threatened anywhere in the world.

The season structure remained mostly unchanged from 1976–2012, with only minor fluctuations in season dates. In 2013, DEC expanded harvest opportunities for bobcats. The end of the trapping season was extended throughout Northern New York from December 10th to February 15th, both the hunting and trapping season in central Tug Hill were extended until February 15th, and a large portion of the Southern Zone was opened for a bobcat harvest for the first time since 1976 (Figure 3).

Historically, about two thirds of the legal harvest of bobcats in New York was by hunting and the remainder by trapping (NYSDEC 2012). However, this trend has shifted in recent years, with

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trapping accounting for about 60% of the harvest over the past 10 years. Most of the bobcat harvest by hunting or trapping is incidental to the pursuit of other species. Two-thirds of hunters who harvested bobcats in 1994–1995 were targeting big game (deer or bear) and harvested their first bobcat. In contrast, about 20% of successful bobcat hunters were specifically hunting bobcats or other furbearers, and these hunters tended to take multiple bobcats in one season or across multiple seasons (NYSDEC 1995). Only about a third of successful bobcat trappers were specifically targeting bobcat.

Since the first seasons were established, there has been a significant increase in bobcat harvest from approximately 200 per year in the 1980s to more than 400 harvested per year since the mid-2000s (Figure 4). Over the past ten years, bobcat harvest has been strongly correlated with bobcat pelt price from the previous year (average pelt price in Northeastern states and Canadian provinces, as reported to the Northeast Fur Technical Committee, unpublished data), which accounts for nearly 60% of annual variation in the harvest. In addition to bobcat pelt price, the harvest was also correlated with the price of fox and fisher pelts, which would be expected if a portion of the harvest occurs incidentally to other trapping. Over the past ten years, bobcat pelt prices peaked in 2012 and 2013 before dropping to a low in 2016, which is reflected in the bobcat harvest. While the opening of new areas in central and western New York likely contributed to the spike in the bobcat harvest seen in 2013, a similar trend was also observed in other furbearer harvests (most notably foxes), showing the importance pelt price plays in driving harvest of these species.

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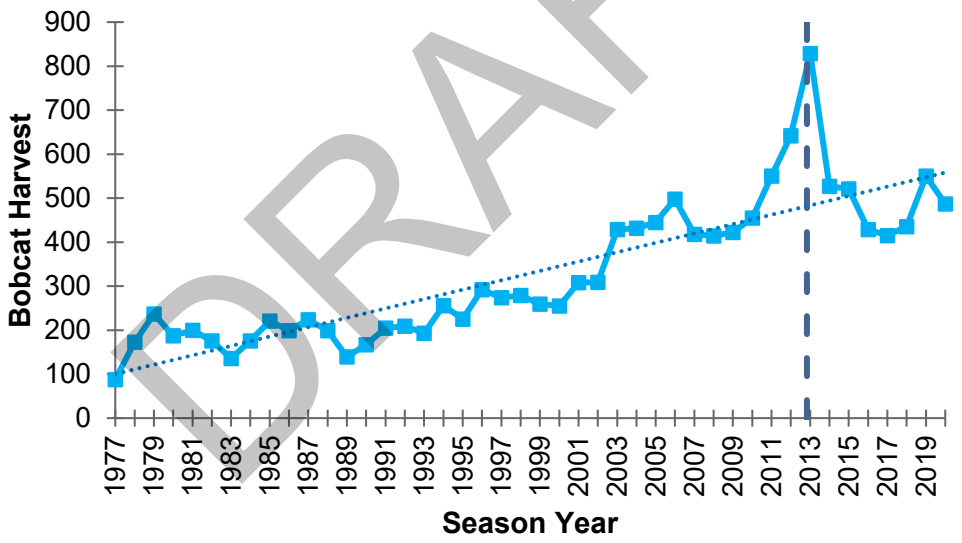

Figure 4. Total New York bobcat harvest (hunting and trapping) from pelt seal data, 1977–2020. The dark blue dashed line highlights the 2013 season, when bobcat hunting and trapping opportunities increased with the opening of the Southern Tier to bobcat harvest and expansion of season dates throughout Northern NY.

While hunters and trappers are the most obvious users of the bobcat resource, wildlife enthusiasts, nature photographers, and others also appreciate the existence of a healthy bobcat population in New York. Many wildlife photographers view the elusive bobcat as a rewarding challenge to capture on film. Others simply value knowing that bobcats exist in the wild in New York, and that they are an indicator of healthy ecosystems. As evidenced by the number of observation reports fielded by DEC staff, the public is very interested in bobcats and can play a role in their management by facilitating the collection of data on this species. This information

helps DEC effectively balance sustainable use of wildlife resources with the desire of the non-hunting public to have opportunities to view bobcat.

2.3 Human-Bobcat Interactions

Bobcat depredation on pets or livestock is generally uncommon, even in areas where bobcat densities are relatively high. While DEC is authorized to issue permits for destruction of bobcats damaging property, such permits are rarely requested or issued. Beginning in 2019, bobcat damage complaints have been tracked by DEC using a standardized database. Between 2019 and 2021, there were 23 complaints involving bobcats. Permits were issued in 13 of these instances, most of which involved bobcats killing poultry.

Bobcat attacks on humans throughout their range are very rare, with the majority of incidents involving rabid bobcats or the occasional bobcat pouncing on a camouflaged turkey hunter while calling birds (NEFRTC, unpublished data). There have only been three recorded instances of bobcat attacks on humans in New York, and the three bobcats involved in these incidents all tested positive for rabies. Bobcats and other wildlife species infected with rabies tend to exhibit increased aggression and lack of fear. For perspective, from 2016 through 2020, the majority of confirmed rabies cases in wildlife in New York were raccoons (42%) and bats (25%) and <0.5% were bobcats (NYSDOH, https://www.wadsworth.org/programs/id/rabies/reports).

2.4 Climate Change and Bobcat Populations

The impacts of climate change on bobcat populations are not conclusive. Bobcats are at the northern edge of their range in the northeast and are limited in parts of New York by winter severity (Fox and Brocke 1983). Historically, the ranges of bobcats and the closely related Canada lynx (*Lynx canadensis*) were largely separated by snow depth (Buskirk 2000), with the smaller-pawed bobcat being restricted to more southerly latitudes compared to lynx. Climate models suggest that winters will continue to warm and snowfall will decline in most parts of New York (NYSDEC 2021), which may benefit bobcats. However, this may be an oversimplification and does not consider other variables that may influence bobcat populations, such as increased frequency of lake effect snow events, variability in mast crop production and changes in the abundance and/or vulnerability of important prey species.

While bobcats are well-suited to exploit a wide variety of prey items, white-tailed deer have historically been an important winter prey item for bobcats in New York (Fox and Brocke 1983; Litvaitis et al. 1984). Feeding on deer allows bobcats to cache prey, allowing them to save energy by reducing foraging movements in deep snow and severe weather, potentially increasing survival rates during this time period. Snow gives bobcats a predatory advantage through a reduction in movement behavior of deer (Moen 1976). At this time, it is unknown if decreased snow cover will negatively impact bobcat ability to successfully prey on deer, or if a prey shift away from deer would negatively impact survival of bobcats. On the other hand, snowshoe hare, another important prey item of bobcats, may become more susceptible to predation during winters with less snow cover. Snowshoe hare exhibit seasonal coat variation, becoming white during the winter to better camouflage and escape detection from predators. Color mismatch can occur when there is no snow cover during the winter, increasing predation risk (Peers et al. 2020).

Higher-than-normal temperatures can induce thermal stress in mammals (Lenarz et al. 2009). The associated higher cortisol levels can lead to reduced reproductive rates and disease resistance (Carroll et al. 2021). The susceptibility of bobcats to such stress is poorly understood.

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3.0 CURRENT STATUS OF BOBCATS IN NEW YORK

After European colonization and unregulated harvest in the 1800s, bobcats in New York were largely restricted to three core areas: the Taconic, Catskill, and Adirondack mountains. Since the 1990s, bobcat populations in New York have increased and expanded beyond their historic core range, moving into central and western New York. Bobcat population trends in New York generally reflect trends across the United States, as many states have reported increasing bobcat populations (Roberts and Crimmins 2010).

Unfortunately, the elusive nature of bobcats makes the effective use of traditional population survey methods difficult and often cost-prohibitive. In the absence of complex field studies, the most common and generally accepted method for estimating abundance involves analysis of data collected from hunters and trappers. In areas without a harvest season, standardized collection of observations from hunters, trappers, and other outdoor recreationists can provide information on the distribution and population trend of bobcats.

The 2012-2017 Management Plan for Bobcat in New York State divided the state into four bobcat management zones using Wildlife Management Unit Aggregates (WMUAs) and individual Wildlife Management Units (WMUs). For the purposes of this plan, we continue to use the management zones outlined in the previous management plan. However, we do note that these zones reflect management strategies within and may change in the future as management changes.

In the sections below, we describe each bobcat management zones in more detail and summarize available harvest and non-harvest data within each zone. Harvest data exists for the Established Harvest Area (from 1976–present) and the Harvest Expansion Area (from 2013–present). Most of the bobcat harvest data in New York have been collected through DEC's pelt sealing program, which requires hunters and trappers to register their harvested bobcat prior to selling or exporting pelts. As part of the pelt-sealing process, harvesters submit furbearer possession tags (FPTs) that include hunter/trapper information and harvest data (e.g., date and location of the harvest, sex of the harvested animal; Appendix III), and DEC staff attach a numbered plastic seal to the pelt. In the summary below, we focus primarily on data from 2013 onward, after the adoption of the 2012–2017 Management Plan for Bobcat in New York State.

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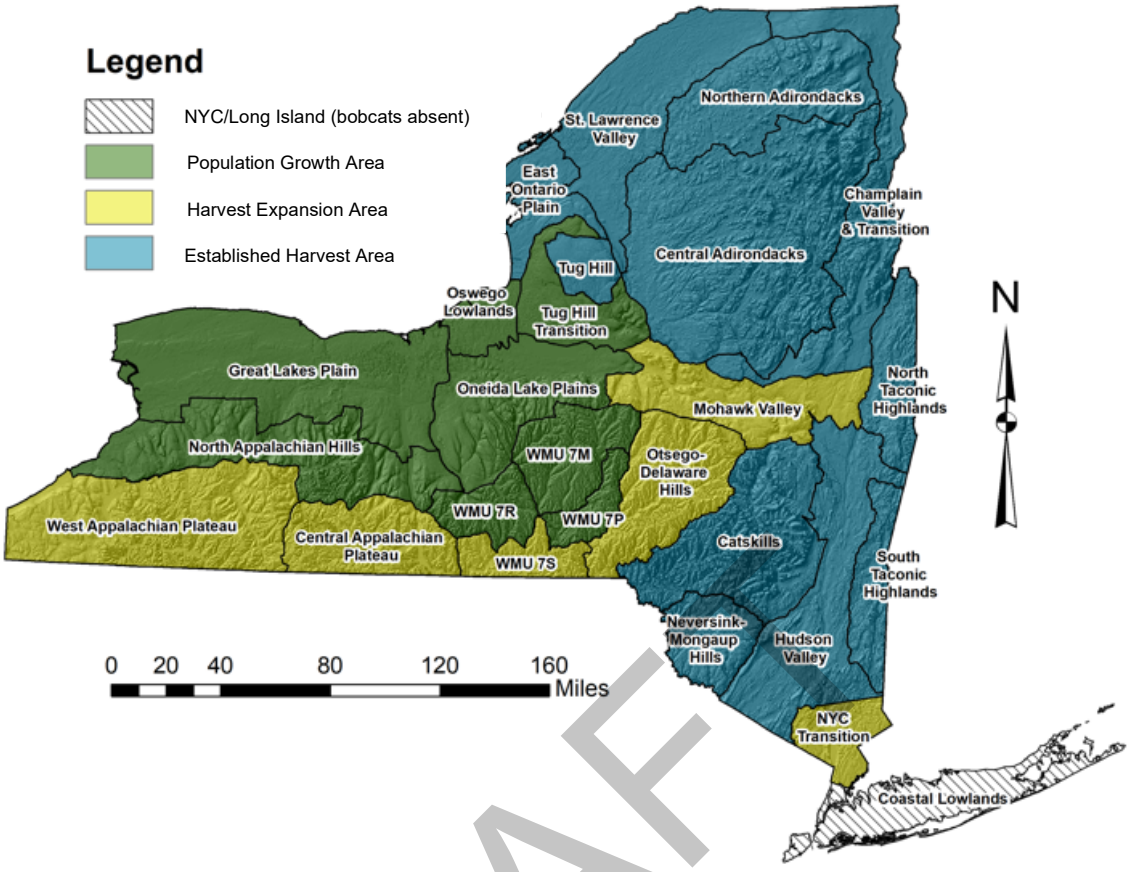

Figure 5. Bobcat management zones in New York State as defined by this plan. Lines within management zones represent Wildlife Management Unit Aggregate boundaries.

3.1 Established Harvest Area

The **Established Harvest Area** (EHA; previously called "Current Harvest Area") includes most of northern New York (WMU aggregates: Champlain Valley and Transition, Central Adirondacks, Northern Adirondacks, St. Lawrence Valley, East Ontario Plain, and Tug Hill) and much of southeastern New York (WMU aggregates: Neversink-Mongaup Hills, Catskills, Hudson Valley, South Taconic Highlands, and North Taconic Highlands).

With periodic changes in area and season dates, there has been a bobcat harvest season in the EHA since the 1970s. Season dates for this area were standardized with the release of the 2012–2017 Management Plan for Bobcat in New York State. The EHA includes the historic bobcat population core areas in New York: the Adirondacks, the Catskills, and the Taconic Region (Fox and Brocke 1983). Previous studies done in these areas found a stable to growing population (Fox and Brocke 1983; NYSDEC 2012). Since this area has supported a bobcat harvest for many years, long-term analyses of harvest data provide the best overview of this population. DEC has also been collecting observations of bobcats in the EHA from the New York State Trapper Survey (a post-season survey of licensed trappers) and the Bowhunter Sighting Log (a standardized diary used by bowhunters to record observations of a suite of game species). Trends in observations from these surveys provide a non-harvest-derived baseline that can be used to further elucidate bobcat population trends.

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Harvest Trends

Over the last 20 years, there has been an overall increase in the bobcat harvest within the EHA (Figure 6), consistent with an increase in bobcat populations throughout much of their range (Roberts and Crimmins 2010). High pelt prices combined with an increase in season length in Northern New York led to a peak in the bobcat harvest between 2012–2014. Trapping license sales during this period were the highest they had been in decades, and this increased trapping effort led to high harvests for all furbearer species. Since that time, bobcat harvest throughout the EHA has displayed a relatively stable trend at levels similar to those observed before the 2012–2014 peak (Figure 6).

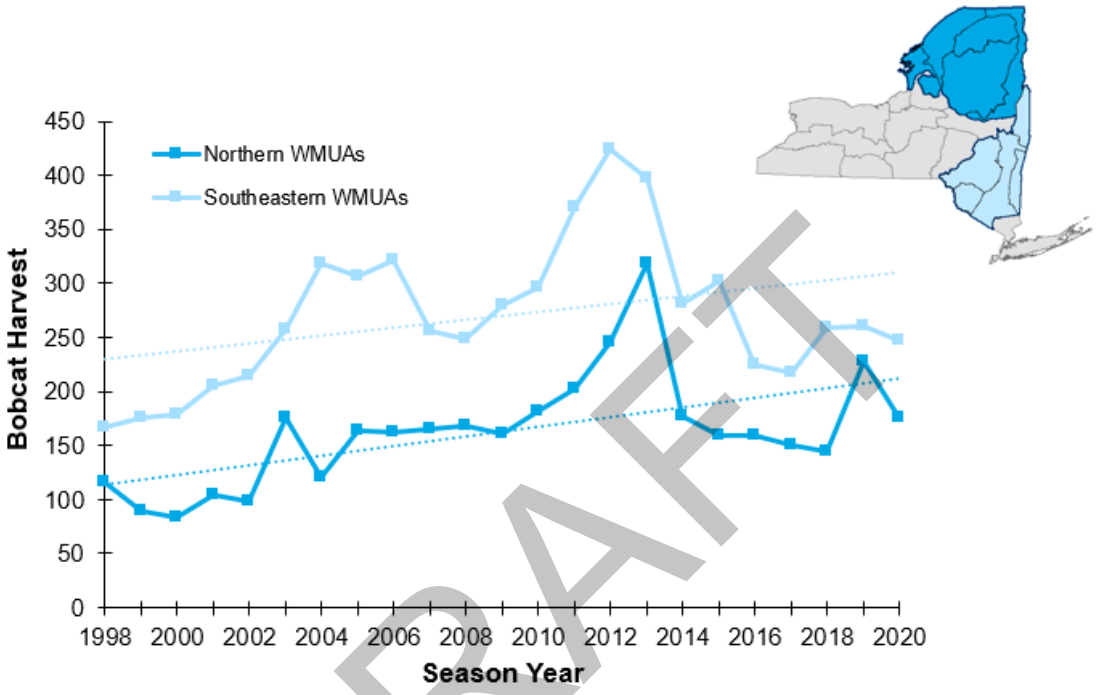

Figure 6. Bobcat harvest in the northern and southern Wildlife Management Unit Aggregates (WMUAs) of the Established Harvest Area, 1998–2020.

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Most of the bobcat harvest in the EHA occurs in southeastern WMUAs, with these aggregates accounting for over 60% of the overall harvest since 2013. Nearly 20% of the harvest since 2013 occurred in the Catskills WMUA. Of the northern New York aggregates, the St. Lawrence Valley consistently has the largest harvest, accounting for 16% of the overall bobcat harvest in the EHA since 2013. In all of the aggregates, the bobcat harvest has been stable or increasing since 1998.

Harvest density, or number of animals harvested per 100 mi^2, is a better metric for looking at harvest trends than raw harvest numbers, as it accounts for differences between areas being compared. Looking at the harvest density by WMUA highlights the importance of smaller aggregates, including the North and South Taconic Highlands (Figure 7). These two areas have significantly higher harvest densities than other WMUAs, indicating that the Taconic Mountains remain an important population core for bobcats. An analysis of harvest data from the Taconic Mountain region in Vermont showed similar results, with average harvest densities in the Taconic Mountains being higher than other biophysical regions in the state (Vermont Fish and Wildlife Department 2016).

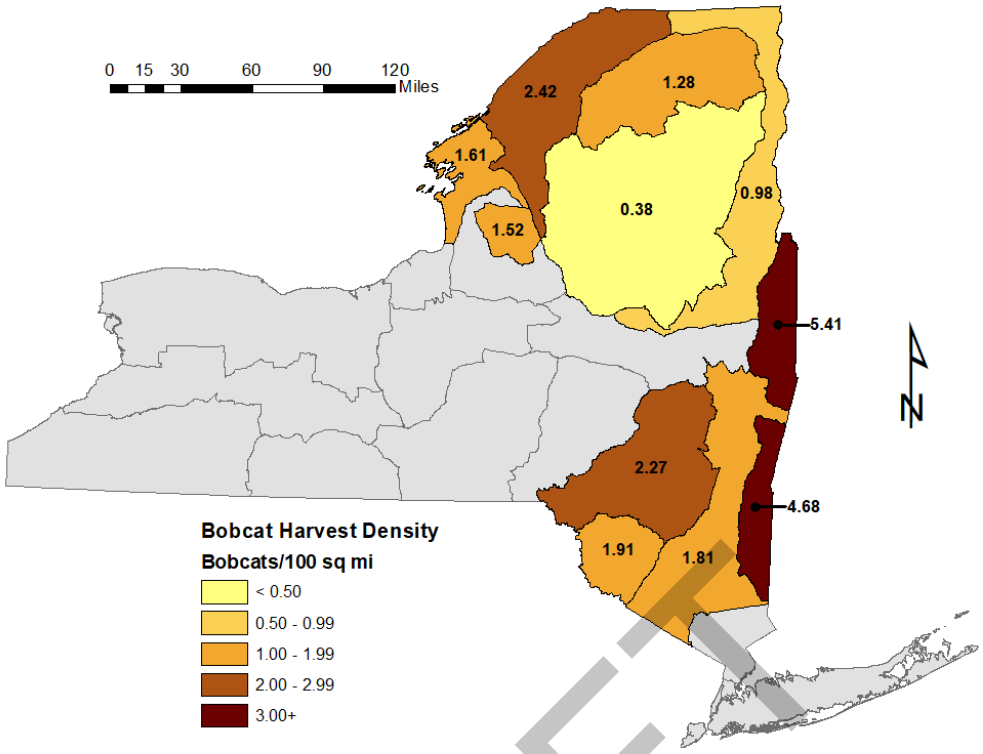

Figure 7. Five-year average harvest density by Established Harvest Area Wildlife Management Unit Aggregate (2016–2020).

Harvest Success

Between 1998–2020, a total of 4,729 people successfully harvested a bobcat in the Established Harvest Area (1,908 in northern WMUAs; 2,867 in southeastern WMUAs). The vast majority of these (82%) were hunters or trappers that successfully harvested a bobcat for only one year, indicating that most harvests were likely incidental or opportunistic. Trappers were more likely to harvest bobcats in multiple years (90% of successful bobcat hunters harvested a bobcat one season and never again, compared to just 68% of trappers). Trappers also had higher success rates than hunters in the EHA, averaging 1.71 bobcats/successful trapper. In comparison, hunters averaged 1.25 bobcats harvested per successful hunter (Figure 8).

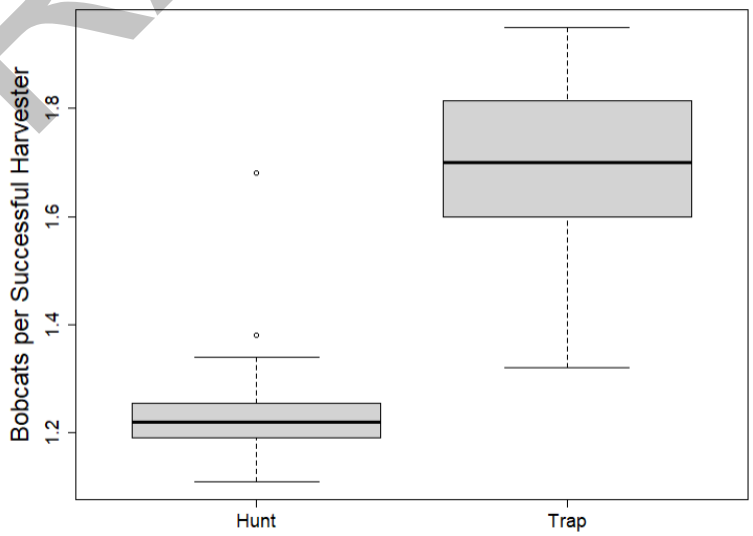

Figure 8. Average annual success rate by harvest method in the Established Harvest Area, 1998–2020.

Over the past 20 years, overall harvest success rates in the EHA have remained largely stable. In the northern half of EHA, there has been a slight, not-statistically-significant decline (Figure 9). In contrast, success rates in southern WMUAs have showed an increasing trend since 1998 (Figure 9). The

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last comprehensive analysis of harvest success rates was completed from 1976–1980. At this time, successful hunters and trappers harvested 1.18 bobcats per year (Fox and Brocke 1983). Harvest success rates are now significantly higher, with successful hunters and trappers harvesting around 1.5 bobcats each year.

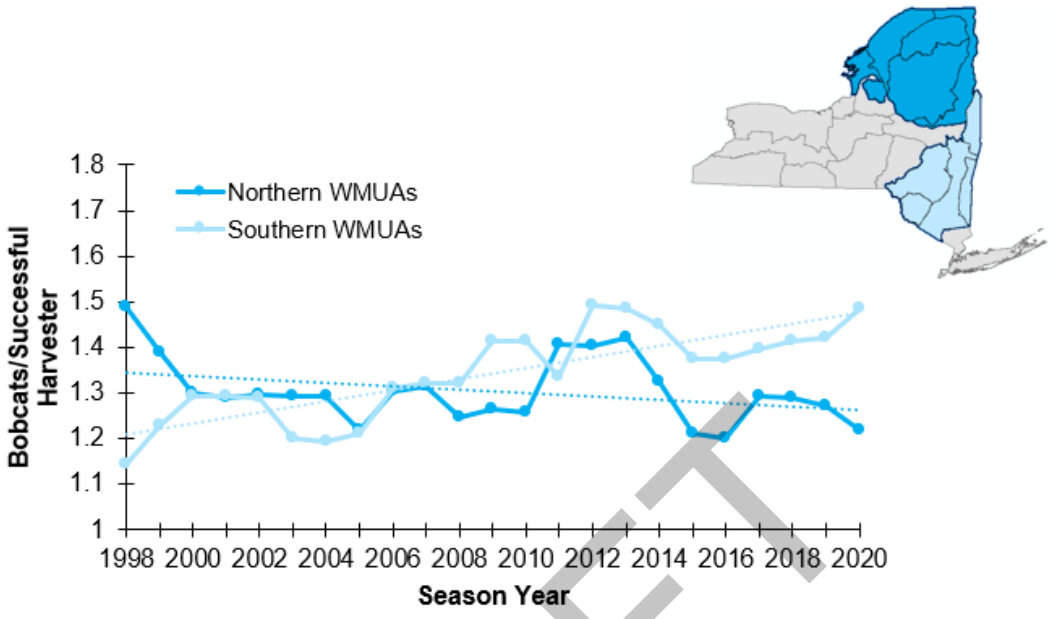

Figure 9. Bobcat harvest success in the northern and southeastern wildlife management aggregates within the Established Harvest Area, 1998–2020.

Harvest Demographics

Between 1998 and 2020, successful hunters and trappers reported the sex of 9,456 bobcats harvested in the EHA (5,902 from southeastern harvest areas and 3,554 from northern harvest areas). There has been a significant female bias in harvested bobcats from these areas (average of 0.72 males per one female). This trend is more significant in northern aggregates (male/female ratio = 0.57) than southeastern aggregates (male/female ratio = 0.83). There was no significant difference in sex ratios between animals that were trapped and those that were hunted.

Between 1976 and 1980, researchers from SUNY-ESF conducted necropsies on a sample of harvested bobcats from the Adirondacks and Catskill/Taconic regions. Interestingly, these necropsies found a male-biased sex ratio, with 1.22 males per one female (Fox and Brocke 1983). This bias was more pronounced in the northern region, with 1.49 males harvested for each female harvested (Fox and Brocke 1983). Overall, however, these sample sizes were fairly low, and did not differ significantly from what would be expected if the sex ratio was 1:1. Bobcats have a 1:1 sex ratio at birth (Anderson 1987; Stys and Leopold 1993), and so the female-biased harvest reported by hunters and trappers in New York warrants closer examination.

Reported sex ratios of bobcats vary widely (Tumlison and McDaniel 1988). In general, males are believed to be more susceptible to harvest due to their larger home ranges (Gashwiler et al. 1961; Fritts and Sealander 1978; Knick et al. 1985). There has been some speculation that females may be more prone to harvest by experienced trappers, as their smaller, intensively used home ranges would have more visible sign than the larger male home range (McCord and Cardoza 1982). However, there has been little evidence that this is actually the case (Tumlison

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and McDaniel 1988). Most Northeastern states where sex of harvested bobcats is determined by internal examination by state agency staff, have reported a 1:1 sex ratio (NEFRTC, unpublished data).

A potential explanation for New York's female-biased harvest could be related to misidentification of males as females. Bobcats are notoriously hard to sex (McCord and Cardoza 1982), and New York currently relies on hunters and trappers to determine the sex of harvested animals and report this information to DEC. Without experienced individuals conducting internal observations, there is a high likelihood that bobcats are improperly sexed. Recent analyses in Maine have found that as many as 50% of harvested bobcats are incorrectly sexed (S. Webb, personal communication). Early analyses from Vermont found a strong female bias (0.40 males/female; Foote 1945). Follow-up analyses including internal examination by trained personnel revealed a 1:1 ratio (McCord and Cardoza 1982). A similar pattern was observed in South Dakota, with a strong female bias reported one year followed by an even ratio the next year when internal examinations were conducted (Fredrickson and Rice 1979).

If accurate, a female-biased harvest could be a cause for concern of overharvest, as the removal of females also impacts future reproductive potential. On the other hand, if the harvest ratio is representative of the overall population, a female-dominated population would foster growth in a polygynous bobcat population. There is some evidence that males dominate high density bobcat populations, while females dominate lower density populations (Lembeck and Gould 1979). Although other metrics in New York suggest a stable bobcat population here, a better understanding of the sex ratio is warranted to ensure a sustainable harvest and have a better understanding of population trends.

Take-per-unit-effort

While direct analysis of harvest data provides important information on the status of bobcat populations, understanding the effort that hunters and trappers expend each season is another piece of the puzzle that helps account for variation in hunting and trapping participation and effort over time. DEC has been monitoring hunter and trapper effort through annual Small Game Hunter and Trapper surveys. Participants estimate the amount of effort (trap-nights for trappers and days hunted for hunters) spent pursuing bobcats, allowing for statewide estimates of take-per-unit-effort (TPUE). The EHA accounts for approximately 80% of the statewide bobcat harvest annually, thus these statewide estimates are most representative of this area. Since effort can vary based on pelt prices, weather, and other factors, changes in TPUE are generally a more accurate reflection of changes in abundance than harvest numbers alone.

Using harvest numbers from pelt seal records and hunting effort estimates from the Small Game Hunter Survey since 2011, it has taken an average of 65 days of hunting annually to successfully harvest one bobcat. The hunting TPUE varies substantially each year; this is likely due to inconsistent coverage of bobcat hunters using this method. The number of respondents that report spending at least one day hunting bobcats is highly variable year-to-year (ranging from 10 in 2014 to 137 in 2015) but tends to be low (average of 31 hunters from 2011-2020). In addition, this survey fails to capture effort data from big game hunters that take bobcats; these hunters take a significant portion of the bobcats harvested by hunting. Because of these limitations, these data have low utility in evaluating bobcat population trends on their own.

Estimates of take-per-unit-effort from the Trapper Survey are generally more reliable with a larger and more representative sample, though this technique still has limited applicability to incidental harvests. Between 2011 and 2020, it took an average of 578 trap-nights (defined as one trap set for one night; 578 trap-nights can be achieved by setting one trap for 578 nights or

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setting 578 traps for one night) to successfully harvest on bobcat. TPUE declined between 2011 and 2016 before rebounding in recent years. The cause of this decline is unknown but may have been related to an increased number of inexperienced trappers when fur prices were high.

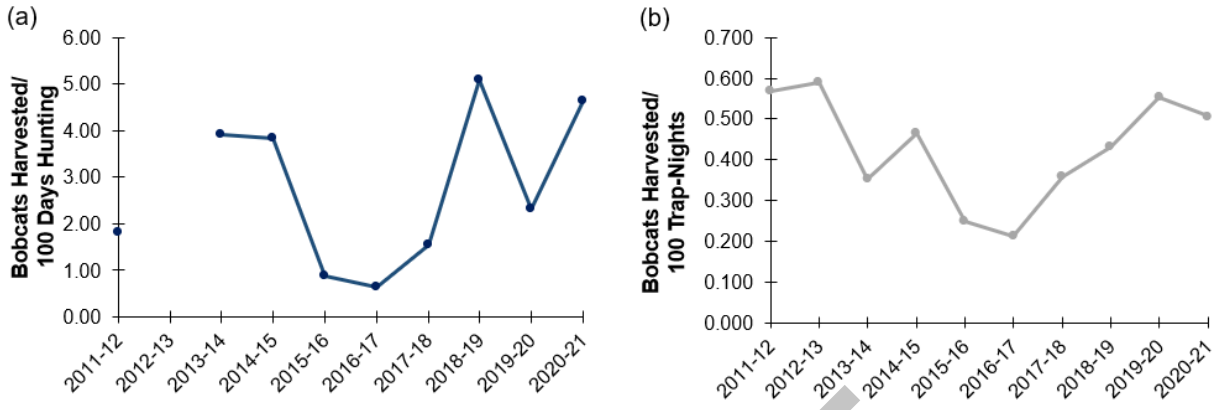

Figure 10. Statewide bobcat take-per-unit-effort for hunting (a) and trapping (b) as estimated by the annual Small Game Hunter and Trapper surveys, 2011–2020. The Small Game Hunter survey was not conducted in 2012.

Observation Rates

DEC collects observations of bobcats through the Bowhunter Sighting Log and the annual Trapper Survey. Hunters and trappers afield can record observations of bobcats through these surveys. Though these observations are susceptible to variation due to number of participants and amount of time spent afield, they are useful metrics, particularly when combined with harvest data.

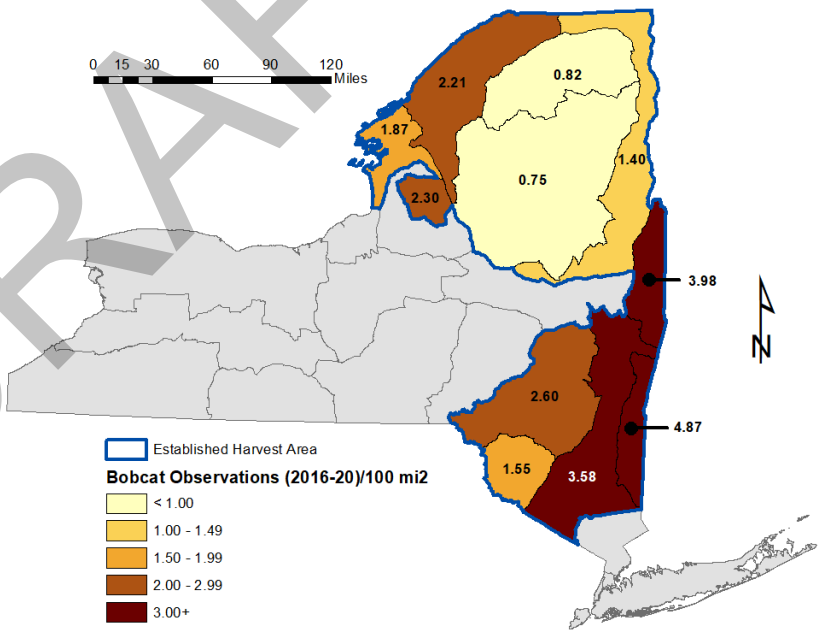

Figure 11. Five-year bobcat observation density (number of animals sighted/square mile) by wildlife management unit aggregate. Observations are reported by trappers and bowhunters participating in the annual Trapper Survey and the Bowhunter Sighting Log, respectively. 2016–2020.

Bobcat observation densities (observations/100 mi^2) from these methods show similar spatial patterns as harvest density. The Taconic Mountain area has the highest observation density in the EHA, followed by the Hudson Valley, Catskills, and Tug Hill (Figure 11). Observation density is low throughout Adirondack WMUs, with the Central Adirondack aggregate having the lowest observation density (Figure 11). This may be partially related to the remoteness of this area with fewer trappers and bowhunters spread out over a large landscape and sub-optimal bobcat habitat comprised of mature forest in an area with deep snow. Overall, bobcat observations have been stable in recent years (Figure 12).

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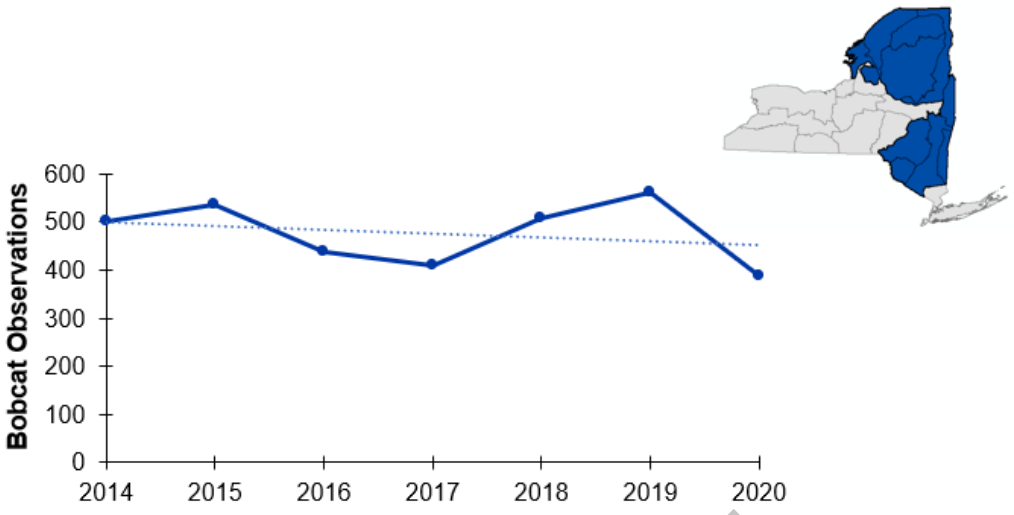

Figure 12. Bobcat observations reported by participating hunters and trappers in the NYSDEC Bowhunter Sighting Log and annual Trapper Survey in the Established Harvest Area, 2014–2020.

3.2 Harvest Expansion Area

Following completion of New York's 2012–2017 Management Plan for Bobcat in New York State, regulations were adopted to increase trapping and hunting opportunities for bobcat. The **Harvest Expansion Area** (HEA) in southern and western New York was opened for bobcat harvest in 2013. This area generally extends across the Southern Tier and includes a portion of the lower Hudson Valley (WMU aggregates and WMUs: West Appalachian Plateau, Central Appalachian Plateau, Otsego-Delaware Hills, Mohawk Valley, New York City Transition, and WMU 7S).

To assess potential impacts of the season opening, from 2013–2016 a special permit was required to hunt/trap bobcats in the HEA in addition to a hunting or trapping license. Between 2013–2015, everyone who received a permit had to complete an effort log and submit the lower jaw of any harvested bobcats for aging. This section will summarize all available harvest and non-harvest data and assess the status of bobcats in the HEA.

Harvest Trends

When a season in the HEA was first proposed in the Management Plan, we estimated between 35–100 bobcats would be harvested (NYSDEC 2012). Since the season opened in 2013, an average of 89 bobcats have been harvested annually in the HEA, within that predicted range. The harvest has remained below the upper estimate every year except for 2013, when 140 bobcats were harvested in the HEA. This year also had the highest number of permits issued, and highest effort expended (see take-per-unit-effort section for more information).

Overall, the harvest in the HEA has declined since 2013 (Figure 13), though this trend has only been significant in two areas (Central Appalachian Plateau and WMU 7S). The decline is primarily driven by large harvests in 2013, when high fur prices coupled with the novelty of a new season fueled high hunter and trapper participation and effort and resulted in New York's largest bobcat harvest in over 20 years. The harvest was also at an all-time high in the EHA,

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showing the influence of fur prices on bobcat harvests. Nonetheless, during the past five years (2016–2020), the harvest has remained stable across the HEA (Figure 13).

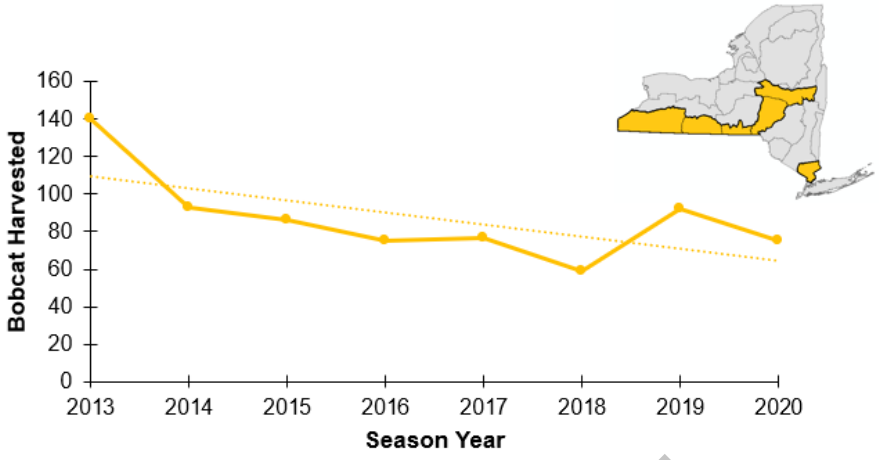

Figure 13. Bobcat harvest within the Harvest Expansion Area, 2013–2020.

On average, approximately 60% of the annual harvest in the HEA occurs in the Central Appalachian Plateau and in Otsego-Delaware Hills; the importance of these two aggregates is also evident when looking at harvest density (Figure 14). Few bobcats are harvested in the New York City Transition aggregate, averaging 2 bobcats harvested a year. This is likely a result of few trappers and furbearer hunters in this area rather than an indication of bobcat abundance in this aggregate. While the overall harvest density is lower in the HEA than in the EHA, the hunting and trapping seasons in the EHA are over four times as long and include additional opportunities for big game and hound hunters to harvest bobcats. When the harvest is standardized by season length (weekly harvest density), there is no difference between the two management areas, and the Central Appalachian Plateau and Otsego-Delaware Hills have the highest harvest density of any aggregates in New York (Figure 14).

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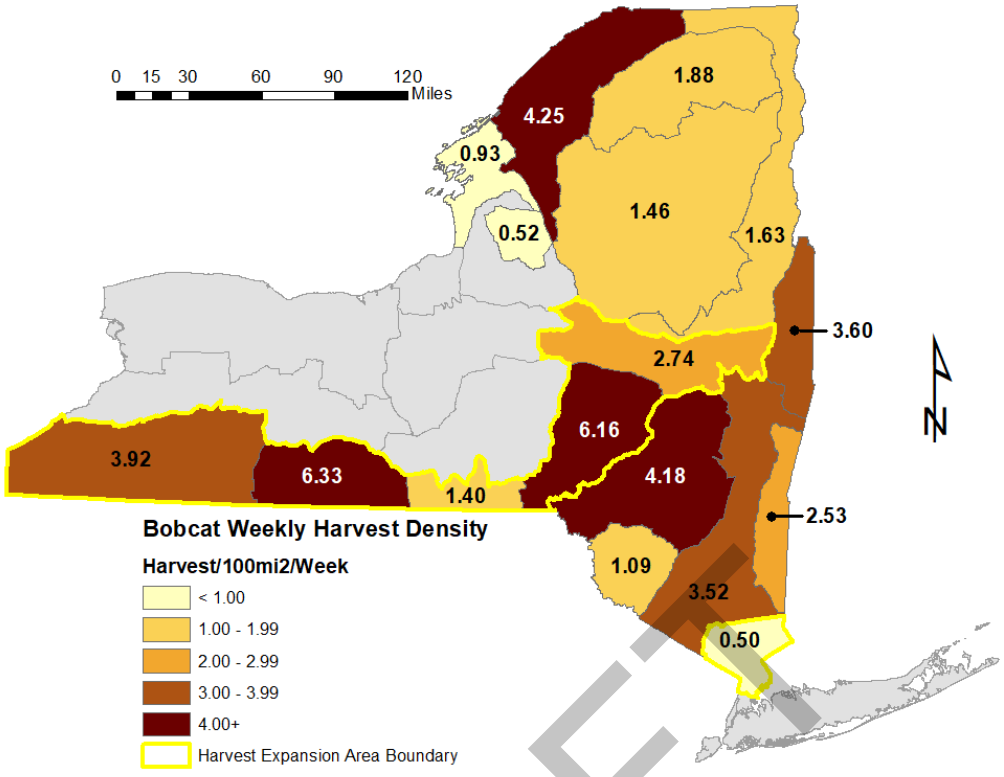

Figure 14. Harvest density of bobcats (average 5-year annual bobcat harvest from 2016–2020) in the Harvest Expansion Area and the Established Harvest Area, standardized by season length.

Harvest Success

Raw harvest numbers do not take into account differences in hunter and trapper effort year-to-year. One way to take effort into account is by looking at harvest success. Between 2013 and 2020, a total of 326 licensed individuals successfully harvested at least one bobcat in the HEA. The vast majority of these were hunters or trappers that successfully harvested a bobcat for only one year, indicating that most harvests were likely incidental or opportunistic. While the bobcat harvest in the HEA has declined slightly since the season opened in 2013, harvest success rates showed a stable trend (Figure 15).

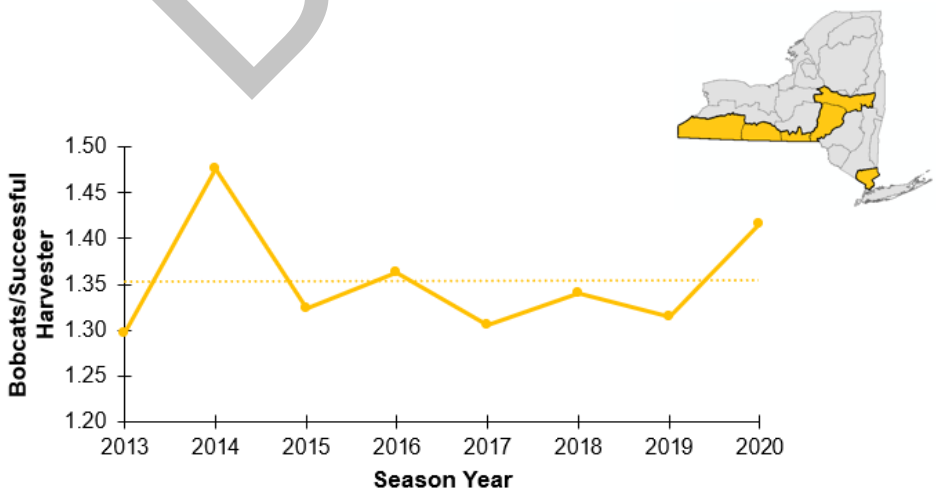

Figure 15. Bobcat harvest success rate in the Harvest Expansion Area, 2013–2020.

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Take-per-Unit-Effort

Between 2013–2015, all hunters and trappers wanting to pursue bobcats in the HEA had to apply for a special permit and complete a hunting and/or trapping activity log. Hunters and trappers would record the number of hours spent hunting bobcats or the number of trap-nights traps were set. During this time period, 57 bobcats were harvested by hunters. It took an average of 508 hours of hunting per harvested bobcat (Table 1). In addition to recording harvest, hunters were also asked to record observations of bobcats during this period. Between 2013–2015, hunters averaged one bobcat sighting every 15 hours spent hunting (Table 1), indicating that hunters saw bobcats more frequently than they harvested them.

Over this same period, 253 bobcats were trapped in the HEA. It took an average of 888 trap-nights to harvest a bobcat (Table 1; equivalent to 0.113 bobcats harvested per 100 trap-nights). In addition to data collected from the activity logs, DEC regionally estimates trapping take-per-effort for bobcats from the annual Trapper Survey. In western New York (which includes some but not all of the HEA), TPUE has been variable but mostly stable at around 0.35 bobcats harvested per 100 trap-nights (286 trap-nights to harvest a bobcat) since the HEA season opened in 2013 (Figure 16). The higher TPUE estimates from the Trapper Survey compared to the activity logs likely result from the methods. The activity logs asked permittees to record all land trapping activity, regardless of whether bobcats were the main species targeted. In contrast, the Trapper Survey asks respondents to estimate trapping effort where bobcats were specifically targeted, which does not account for incidental captures and results in an underestimation of effort.

Table 1. Bobcat take-per-unit effort for hunters and trappers in the Harvest Expansion Area, 2013–2015.

Harvest Method	Metric	Year		
		2013	2014	2015
Hunting	Hunting Harvest	21	18	18
	Observations/1,000 Hunting Hours	17.9	12.3	14.5
	Hunting Effort (hours per bobcat harvested)	476	649	399
Trapping	Trapping Harvest	118	71	64
	Trapping Effort (trap-nights per bobcat harvested)	730	806	1,127

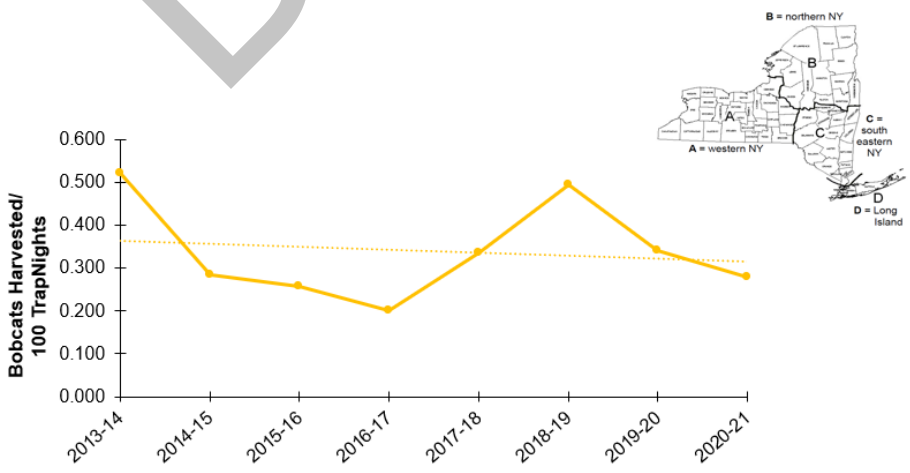

Figure 16. Trapper take-per-unit effort in western NY (zone A in the map at top right), as estimated from the annual Trapper Survey, 2013–2020.

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Harvest Demographics

To monitor impact of establishing harvest in the HEA, DEC collected teeth from bobcats harvested in the HEA from 2013–2015 (Figure 17). The age structure of a population is believed to reflect the intensity of harvest, with younger animals (<2 years old) dominating heavily exploited populations due to increased adult mortality and/or increased reproduction (Anderson 1987). In some heavily exploited, low-density populations, young bobcats may make up nearly 80% of the population (Fredrickson and Rice 1979). However, in the HEA, 49.5% of the harvest from the first 3 years of the season was comprised of animals under 2 years old, indicating that harvest pressure in this area may be low compared to more heavily exploited populations observed outside of New York. (Figure 18).

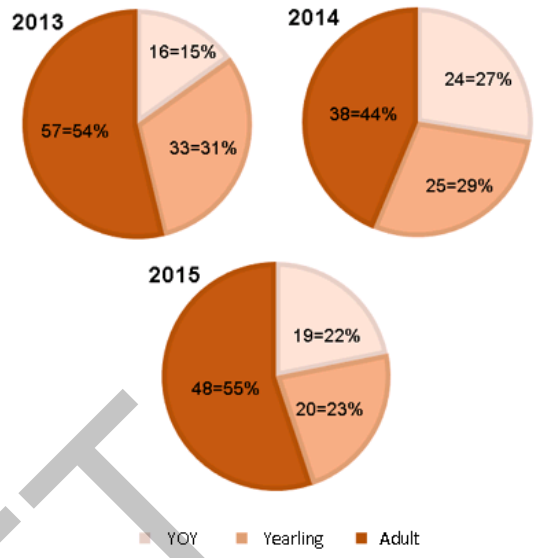

Figure 17. Age structure of harvested bobcat by year in the Harvest Expansion Area from 2013–2015.

To further evaluate the impacts of the bobcat season in the HEA, DEC staff, in partnership with Cornell University, estimated survivorship and population growth rate of this population over the first several years of harvest. We used a stage-specific life-cycle Leslie matrix projection model (Figure 19; Leslie 1945, Leslie 1948, Caswell 2002, Roberts 2010). Using the harvest age structure from 2013–2015, we estimated adult annual survival of bobcats in the HEA to be 0.82 (± 0.35). In other words, any adult bobcat in the HEA had an 82% chance of surviving to the next year over this time period. To be conservative, we estimated juvenile survival to be 50% of this adult survival rate (Roberts 2010). We assumed average litter size of 2.7 kittens per litter and assumed that there was no reproduction in juvenile bobcats (Roberts 2010). Research that occurred in New York in the 1970s found an overall average litter size of 2.5 kittens; however, when juveniles were excluded from this analysis the average litter size was 3.0 kittens (Fox and Brocke 1983). A range-wide meta-analysis of bobcat litter sizes conducted by Anderson (1987) found an average litter size of 2.7 kittens; we selected this more conservative number for this analysis. Using this approach, annual growth rate was estimated to be 1.02, indicating a stable or slightly growing bobcat population in the HEA. This estimate is likely conservative, as we assumed no juvenile reproduction was occurring despite evidence that juvenile bobcats are capable of reproduction (Anderson 1987).

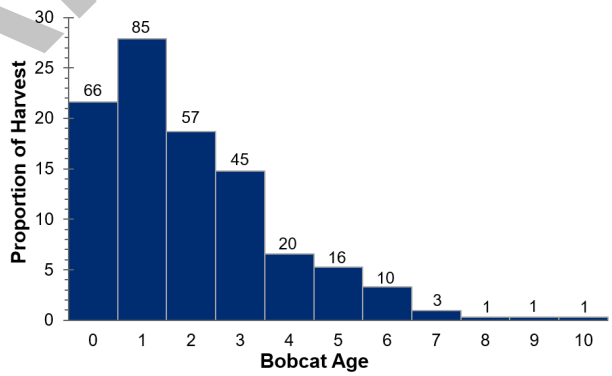

Figure 18. Age structure of harvested bobcat in the Harvest Expansion Area from 2013–2015.

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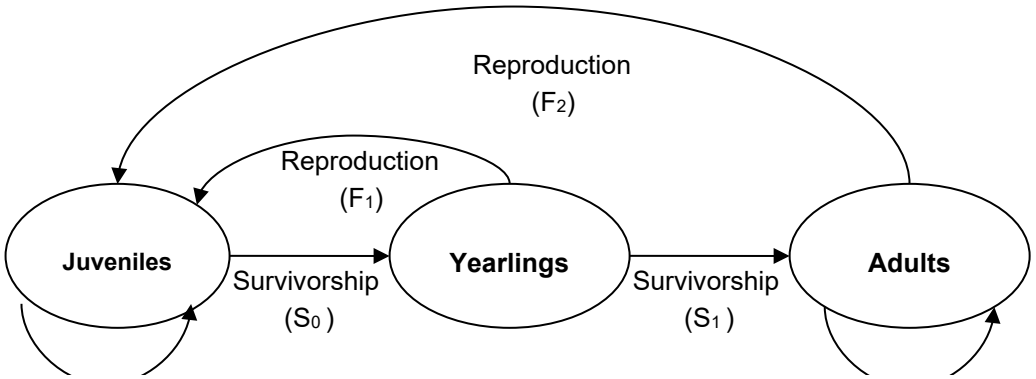

Figure 19. Stage-specific life-cycle diagram for the bobcat.

Between 2013 and 2020, DEC collected sex data from 663 bobcats harvested in the HEA. As in the EHA, the harvest has been significantly biased towards females (average of 0.57 males harvested per one female). As mentioned in the discussion above about harvest rates for the Established Harvest Area, there are several different factors that may be contributing to the strong female-bias. It is likely that misidentification of males as females is playing some role.

If there are truly nearly 2 females harvested for every one male in the HEA, this could have implications for this population, as the removal of females impacts future reproductive potential. Other population metrics imply a stable or growing population of bobcats in the HEA, which supports the idea that the sex of harvested bobcats is being misidentified by successful hunters and trappers rather than overexploitation of female bobcats. The newness of the harvest season in this area means that we may not have seen the full effects of the harvest yet. A better understanding of the sex ratio in this management area is warranted to ensure a sustainable harvest.

Observation Rate

In the 2012–2017 Management Plan for Bobcat in New York State, DEC proposed the opening of the HEA based on bobcat observation rates. The criterion looked at 5-year observations gathered from the Bowhunter Sighting Log and annual Trapper Survey between 2006 and 2010. The HEA aggregates were selected for opening because they had a minimum of 1.0 bobcat observations/100 mi^2 and 50% of each WMU that comprised the aggregate had a minimum observation rate of 1.0 bobcat observations/100 mi^2. If individual WMUs had an observation rate greater than 2.0 bobcat observations/100 mi^2, that WMU was considered for opening (as was the case with 7S; the other WMUs in East Appalachian Plateau did not meet the minimum criteria for opening a season, but 7S did).

Overall, the trend of reported bobcat observations in the HEA has been stable over the past 10 years (Figure 20). Bobcat observation rates from 2016–2020 are comparable to the observation rates reported from 2006–2011, before the opening of the harvest season in the HEA. All aggregates in the HEA, with the exception of the New York City Transition, still meet the observation rate criteria outlined in the 2012–2017 Plan (Figure 21).

One of the limitations of this metric is the variance in the number of participating bowhunters and trappers in aggregates. For example, the observation rate for the New York City Transition aggregate is low compared to other HEA aggregates (0.76 bobcat observations/100mi^2).

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However, there are relatively few cooperating trappers and bowhunters active in this aggregate (average of 72 bowhunters that contribute to the bow log annually, compared to an average of 714 cooperating bowhunters active in the West Appalachian Plateau). This also explains the low observation rates in northern New York compared to the HEA, where bowhunter participation is significantly lower. This index is useful for comparing observation rates in the same WMU aggregate over time, but direct comparisons between aggregates is not recommended.

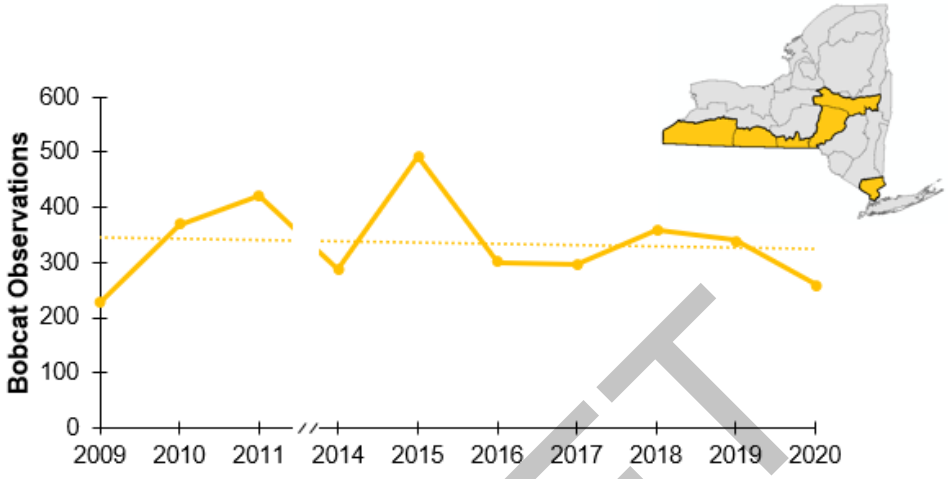

Figure 20. Bobcat observations reported by participating hunters and trappers in the NYSDEC Bowhunter Sighting Log program and annual Trapper Survey in the Harvest Expansion Area, 2009–2020. There are no data from 2012 and 2013.

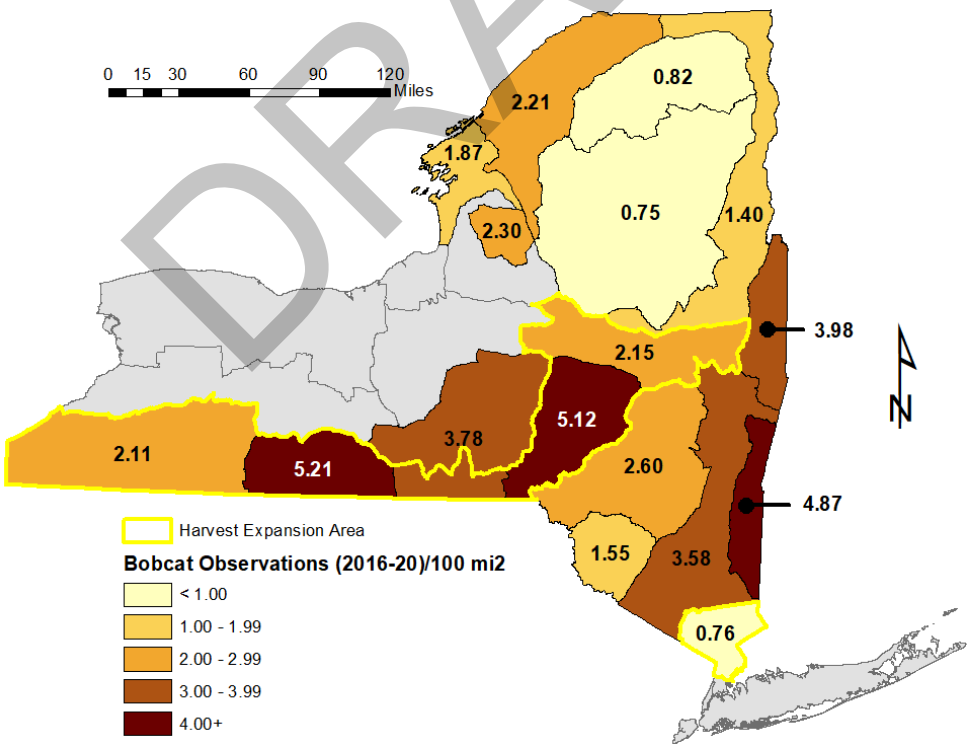

Figure 21. Bobcat 5-year observation density (number of animals sighted/square mile) by wildlife management unit aggregate. Observations are reported by trappers and bowhunters participating in the annual Trapper Survey and the Bowhunter Sighting Log. 2016–2020.

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3.3 Population Growth Area

The **Population Growth Area** (PGA) includes areas where DEC will allow maximum growth of bobcat populations, with no immediate plans to establish harvest seasons. This encompasses the areas around Lake Ontario and the Finger Lakes, and other parts of western and central New York (WMU Aggregates and WMUs: Tug Hill Transition, Oswego Lowlands, Oneida Lake Plain, North Appalachian Hills, Great Lakes Plan, and WMUs 7M, 7R, and 7P).

Bobcats were absent from this area by the mid-1800s. Observations by hunters, trappers, hikers, farmers, trail camera users, and others who spend time outdoors show that bobcats are expanding into this area. Soliciting observations from the public is a relatively low-cost method of obtaining data on bobcats. Observation data obtained from hunters and trappers have proven useful in documenting changes in bobcat distribution and are currently the primary means of assessing bobcat distribution and abundance in the PGA. Results from these surveys are summarized below.

Observation Rates

Overall, the number of reported bobcat observations in the PGA as reported on the annual Trapper Survey and the Bowhunter Sighting Log has increased significantly over the past 10 years (Figure 22). This increase is largely driven by increasing observations in the East Appalachian Plateau and, to a lesser extent, the North Appalachian Hills. This provides evidence that the bobcat population in the southern tier, possibly fostered by emigration of bobcats from Pennsylvania, is expanding their range farther north.

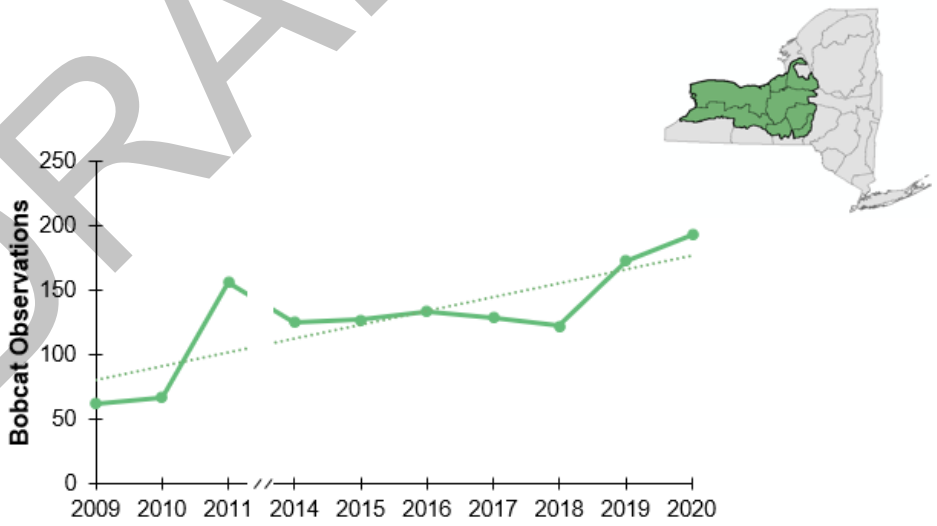

Figure 22. Bobcat observations reported by participating hunters and trappers in the NYSDEC Bowhunter Sighting Log program and annual Trapper Survey in the Population Growth Area, 2009–2020. There are no data from 2012 and 2013.

Members of the general public can also submit observations of bobcats via DEC's online Furbearer Sighting Survey. Since the sighting survey began in 2013, 1,397 individuals submitted sightings of 1,763 bobcats across New York. Unfortunately, it is impossible to verify all of these sightings. The sighting survey does allow for the submission of photographs with the sightings; however, less than 20% of the sightings include a photograph. Overall, the number of bobcats reported via the public sighting survey annually is highly variable and is currently probably driven more by public knowledge of the survey than bobcat abundance throughout New York. The observation density reported from the public sighting survey is much lower than that derived from the Trapper Survey and Bowhunter Sighting Log (Figure 23). However, it represents an additional source of data, which is important in the Population Growth Area where information on bobcat distribution and abundance is limited.

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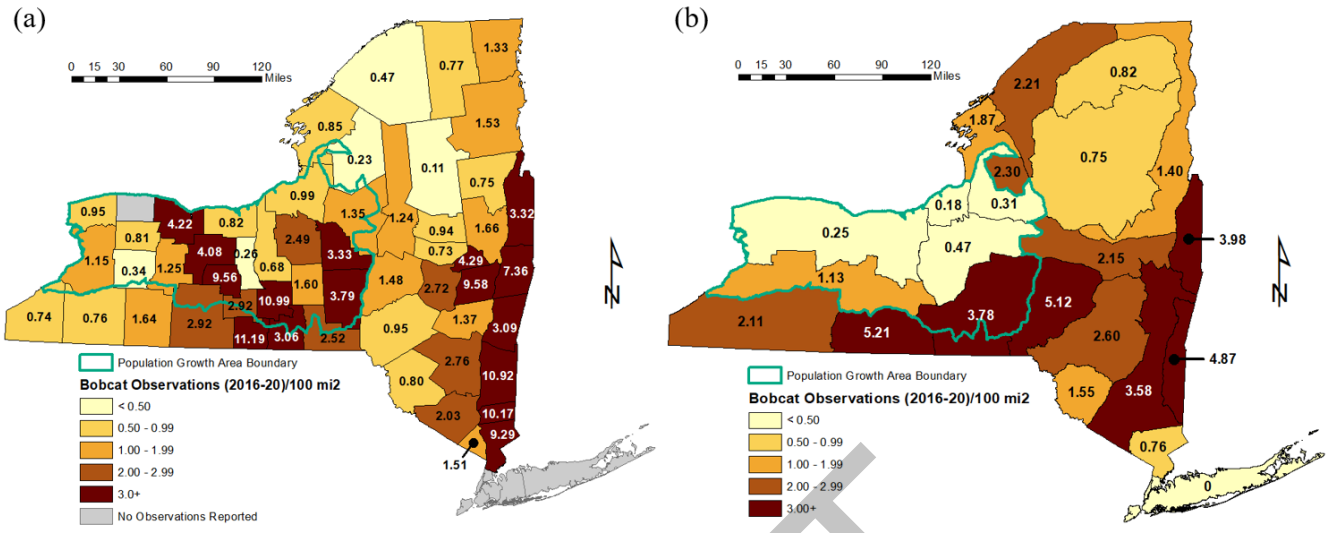

Figure 23. Five-year bobcat observation density (number of animals sighted/square mile) as reported by (a) the general public via DEC's online Furbearer Sighting Survey and (b) trappers and bowhunters participating in the annual Trapper Survey and the Bowhunter Sighting Log. Sightings by the general public are reported at the county level, while sightings from hunters and trappers are at the wildlife management unit aggregate level. 2016–2020.

3.4 NYC/Long Island

NYC/Long Island (previously called "No Bobcat Area") is the area of New York where bobcats are not currently present. This includes all of New York City and Long Island (Coastal Lowland WMU Aggregate).

While bobcats did historically occur in New York City and on Long Island, they have been extirpated from the area since the early 1800s (DeKay 1842; Connor 1971). It is unlikely that they will colonize this region naturally due to the geographic isolation from nearby populations and the high road density in the area (Lovallo and Anderson 1996b; Tigas et al. 2002; Riley et al. 2003). However, there are occasional reported sightings of "large cats" from Long Island, which upon closer investigation have been documented to be feral or domestic house cats or occasionally exotic cats being kept as pets. DEC will continue to investigate these reports as they come in. If bobcats are confirmed on Long Island, we will monitor the populations through public sightings. If warranted by confirmed public sightings, more targeted field surveys would be conducted.

Some people have advocated for restoration of bobcats to Long Island. It is uncertain whether the public would tolerate reintroduction of this species to this urbanized region. Given the territorial nature of bobcats, establishment of a population in the eastern portions of Suffolk County, if possible, would likely result in frequent dispersal of individuals westward into highly developed areas, where road kills and other conflicts would arise. With its highly developed landscape and heavy vehicular traffic, the likelihood that Long Island could support a bobcat population is low.

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3.5 Summary

Established Harvest Area

All indices indicate a stable to growing bobcat population in the Established Harvest Area. Overall, the bobcat harvest in the EHA has increased significantly over the past 20 years. In recent years, the harvest has remained stable after a peak in 2013–2014 corresponding with high pelt prices. Most of the harvest occurs in southeastern NY, with the Taconic region having the highest harvest densities in the state. Harvest success rates and take-per-unit-effort estimates have remained stable in the EHA. Harvest success rates estimated in recent years are significantly higher than rates reported from the 1970s (Fox and Brocke 1983). Reported observation densities show a similar trend as harvest density, with the highest observation densities reported from the Taconic Mountains, Catskills, and Tug Hill area. Overall, observation rates as reported by hunters and trappers in the EHA have been stable.

Harvest Expansion Area

After being extirpated from this part of New York, bobcat populations in the Harvest Expansion Area have made a remarkable recovery. Total bobcat harvest, harvest success rates, and bobcat observation rates all indicate a stable to growing population in the HEA. Demographic analyses from the first three years of harvest in this area showed an overall age structure similar to an unharvested population and a population growth rate above 1.0. However, additional work is needed to determine trends in specific aggregates where larger sample sizes will improve confidence in the trends observed. In addition, the reported sex ratios from both the EHA and HEA warrant additional investigation.

Population Growth Area

Once completely extirpated from this part of New York, bobcats are now consistently documented in the PGA. Over the past 10 years, there has been a significant increase in bobcat sightings in this area; bobcats have been reported by trappers and bow hunters in every WMU except for 9A, 9C and 9F, which include the heavily urbanized greater Buffalo area. There have been anecdotal bobcat sightings reported by the general public even in these WMUs; however, these sightings have not been confirmed through photographic evidence. The largest increases in observation rates have been along the HEA border, providing evidence that the bobcat population in this area may be expanding into the PGA.

NYC/Long Island

While bobcats did historically occur in New York City and on Long Island, they have been extirpated from the area since the early 1800s (DeKay 1842; Connor 1971). It is unlikely that they will colonize this region naturally due to the geographic isolation from nearby populations and the high road density in the area (Lovallo and Anderson 1996b; Tigas et al. 2002; Riley et al. 2003).

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4.0 GOALS, OBJECTIVES & STRATEGIES

GOAL 1: Maintain or enhance bobcat populations in all areas of the state where suitable habitat exists.

GOAL 2: Provide for the sustainable use and enjoyment of bobcats by the public.

GOAL 3: Ensure that DEC is meeting the public desire for information about bobcats and their conservation, use, and enjoyment.

Objectives and strategies that support these goals within bobcat management zones include the following:

GOAL 1. Maintain or enhance bobcat populations in all areas of the state where suitable habitat exists (EHA, HEA, & PGA).

Objective 1.1: Determine status, distribution, and population trends of bobcats in New York.

- *Strategy 1.1.1.* Annually determine observation density of bobcats in New York through structured collection of public sightings, such as those collected from the Trapper Survey and Bowhunter Sighting Log.

- *Strategy 1.1.2.* Monitor bobcat distribution by collecting verifiable bobcat sightings from the public via the Furbearer Sighting Survey.

  DEC will continue to collect observations through various user groups including the annual Bowhunter Sighting Log program, annual Trapper Survey, and verifiable sightings reported via the Furbearer Sighting Survey. We will request observation reports from all sources via the annual hunting and trapping regulations guide, DEC's website, outreach to user groups, Division of Fish and Wildlife's newsletters, and social media outreach. We will continue to solicit and collect this information with particular emphasis on observations confirmed with photographic evidence or a carcass. Information, including sex and age when possible, will be collected from road kills, incidental captures, and reliable photographic evidence. Observation data will be stored in a centralized database or spreadsheet that is compatible with a Geographic Information System (GIS).

  Soliciting observations from the public is a relatively low-cost method of obtaining data on bobcats. Observation data obtained from hunters and trappers have proven useful in documenting changes in bobcat distribution at little cost to DEC. The annual Trapper Survey provides an excellent source of observation data. Questions on the survey regarding bobcat observations should continue. In addition, the Bowhunter Sighting Log was established primarily for the management of white-tailed deer but has also been useful as an index to monitor relative abundance of a variety of wildlife species and should continue as a tool to also document selected furbearers, such as bobcat. We recognize that sightings reported by the general public are not representative of overall species distribution since the public is more likely to report a sighting when it is an uncommon or noteworthy observation.

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- *Strategy 1.1.3.* Develop harvest-independent surveys to determine bobcat occupancy and abundance throughout New York.
    - 1.1.3.1 Statewide camera trap surveys
    - 1.1.3.2 Bobcat-specific surveys

  Developing reliable estimates of wildlife population trends is crucial to the proper management of wildlife species, including bobcats. To date, most of DEC's understanding of bobcat populations is from harvest data. Since harvest can vary annually due to a variety of factors unrelated to animal abundance (e.g., hunter effort, weather, fur prices), harvest-independent data is a more accurate reflection of wildlife populations. In addition, harvest-independent data provides information in areas without harvest seasons.

  Wildlife managers are increasingly turning to remote camera surveys as a non-invasive method for estimating distribution and occurrence of species. Camera surveys are an affordable and efficient way to survey multiple species across large scales. Several states, including Wisconsin and North Carolina, have developed statewide camera surveys to provide important information on the occurrence and abundance of various species of wildlife. DEC has previously used camera surveys to estimate occurrence and density of fisher in central and western New York and to estimate bear abundance (Sun et al. 2019).

  Currently, researchers at SUNY-ESF are developing the Adirondack Inventory & Monitoring (AIM) Camera Trap Network, which will provide occurrence data for species within the Adirondack Park and northern New York. DEC is currently partnering with Cornell University to develop protocols for a camera survey that can be used throughout the rest of the state. This survey will provide estimates of occurrence for many species, including bobcats.

  Although we hope to obtain reliable estimates of bobcat occupancy from a multi-species camera survey, previous work has shown that bobcats have very low detection rates (DEC, unpublished data). In recent years, states including West Virginia and New Jersey have conducted bobcat surveys to estimate occupancy and abundance. We are currently working on developing a targeted survey for bobcats throughout New York, with emphasis on Central and Western New York. A pilot study conducted in 2022-23 used a hair snare cubby to attempt to collect hair from bobcat that could be used for a spatial capture-recapture analysis (Rounsville 2018). Unfortunately, only one region had a bobcat enter a cubby. DEC is now attempting a study using a combination of camera traps and marked animals to estimate bobcat density. Surveys will be conducted for two consecutive years and, if successful, can be repeated in the future to track changes in bobcat populations.

Objective 1.2: Estimate population demographics and vital rates in harvested bobcat populations throughout New York.

- *Strategy 1.2.1.* Continue DEC's pelt-sealing program to track bobcat harvest numbers and demographic information through Furbearer Possession Tags.

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- *Strategy 1.2.2.* Collect bobcat carcasses throughout New York for three years to estimate population age structure, reproductive parameters, and sex ratio of harvested bobcat populations.

- *Strategy 1.2.3.* Investigate potential for tissue collection to determine sex of harvested bobcats and develop protocols for tissue collection.

  DEC will continue to monitor harvest trends through mandatory pelt sealing. These data will allow us to track changes in harvest density on a WMUA-scale. We will continue to collect Furbearer Possession Tags for all harvested bobcats, which include information on the location of harvest, harvest method, and sex of the harvested animal.

  In other Northeastern states, bobcats appear to exhibit a 1:1 sex ratio (NEFRTC, unpublished data), and research conducted in the 1970s found a 1:1 ratio in New York (Fox and Brocke 1983). However, DEC analysis of sex data reported by hunters and trappers from harvested bobcats has found a significant female-bias in the statewide harvest. A similar female-bias was documented in Vermont (Foote 1945). Follow-up work in Vermont found that the bias was related to harvesters misidentifying the sex of bobcats (Tumlison and McDaniel 1988). Vermont now relies on internal examination by agency staff to identify sex of bobcat carcasses and reports a 1:1 sex ratio in their harvest (K. Royar, Vermont Fish & Wildlife, personal communication).

  Currently, New York relies on successful hunters and trappers to identify sex of bobcats taken. It is possible that misidentification of sex, particularly the identification of males as females, is driving the female-bias in the harvest. To get a better idea of the actual sex ratio, we will collect bobcat carcasses, including a canine tooth, for three seasons. In addition to conducting internal examinations to determine sex, DEC will work with cooperators to collect and analyze bobcat reproductive tracts to determine litter size and reproductive rates throughout the state. These data on reproductive information will better inform population modeling.

  Identifying sex through carcass collection of harvested bobcats is a labor-intensive process for DEC staff. We will explore the potential of determining sex through a small tissue sample collected at the time of pelt sealing. We will work with other states doing similar research to determine methods that have proved successful. If necessary, we will confirm sex through carcass collection to ensure accuracy with the tissue sample method. Establishing a less labor-intensive method of identifying sex, such as tissue sample collection, will allow us to more easily monitor sex ratios on a recurring basis. In addition, we have created an informational document on sexing furbearers, including bobcats (Appendix IV) that is posted on DEC's website and provided to hunters and trappers at outreach events and on request.

Objective 1.3: Develop a population model to estimate population trends by WMUA.

- *Strategy 1.3.1.* Develop a population model that can be used to monitor bobcat populations and that is updated regularly with new data on distribution, abundance, age, sex, and harvest.

  DEC has worked with a university cooperator to develop a life history model to estimate population trends from harvest rates. This model incorporates harvest data by age class

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and sex to determine vital rates and estimate population trend. The goal of this model is to estimate population trends by WMU aggregate. The existing model was validated with data collected from the Harvest Expansion Area from 2013–2015; however, more years of data are needed to create robust estimates.

We will continue to work on improving this model by incorporating harvest-independent (Objective 1.1) and harvest-dependent data (Objective 1.2) and exploring opportunities to use an Integrated Population Model (IPM) framework.

GOAL 2. Provide for the sustainable use and enjoyment of bobcats by the public.

Objective 2.1: In areas with an open bobcat harvest, annually monitor harvest trends at the WMU aggregate-level through the collection of harvest and effort data.

- *Strategy 2.1.1.* Develop a survey of bobcat harvesters to better understand harvest methods, take per-unit-effort, and hunter/trapper satisfaction with existing bobcat seasons.

- *Strategy 2.1.2* Evaluate existing harvest regulations by comparing harvest trends (**Objective 1.2**) to population trends (**Objective 1.3**).

  Take-per-unit effort data improves our ability to interpret harvest fluctuations. Estimating bobcat TPUE is a unique challenge, as the species can be both hunted and trapped. In addition, a significant portion of the harvest is opportunistic – big game hunters who harvest a bobcat or trappers targeting other species but happen to harvest a bobcat, which can be difficult to quantify.

  The annual Trapper Survey is sent to 4,500 trappers and provides an excellent source of trapping take-per-unit effort, incidental catches, and observation data. DEC will continue to collect data annually by utilizing this survey. However, this survey fails to capture hunting effort for bobcat. While we also conduct an annual Small Game Hunting Survey and use those results to estimate bobcat take-per-unit-effort related to hunting, any opportunistic harvest from big game hunters is not adequately captured. We will explore additional options for better quantifying bobcat take-per-unit-effort and gaining a better understanding of harvest methods. One of these potential options is a voluntary survey sent to a subset of hunters or a survey sent to successful bobcat hunters.

  A voluntary survey could also be used to evaluate trapper and hunter preferences related to season timing. DEC often receives comments from trappers regarding the timing of the bobcat season. Some trappers believe that the trapping season should start later to maximize pelt quality. To evaluate preferred season dates for furbearer trapping and hunting and to investigate what factors influence season timing preferences, we surveyed 4,500 trappers and furbearer hunters in 2017. Despite furbearer trappers and hunters indicating that pelt quality was the most important factor to them, a majority of respondents selected October 25th as their preferred season opening date (Appendix V). This cause of this discrepancy is unknown, but we will continue to evaluate trapper and hunter preferences as related to season timing to help inform management decisions.

  We will utilize population trends estimated in the bobcat population model (Objective 1.3) to evaluate existing harvest regulations and propose changes to current season timing and length, where appropriate. Information on population trends, take, and harvest

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pressure will be paired with social science data on hunter and trapper values and preferences to inform decisions on season setting.

Objective 2.2. Develop and implement monitoring criteria to evaluate the potential for opening additional WMUs or WMUAs to harvest or modifying harvest opportunities in open WMUs/WMUAs.

- *Strategy 2.2.1.* Review and summarize existing bobcat harvest management criteria and strategies throughout the Northeastern United States and Canada.

- *Strategy 2.2.2.* Establish criteria to guide recommendations for modifying existing opportunities or opening new areas to bobcat harvest.

With evidence suggesting growing or stable bobcat populations throughout most of New York, changes to the management zones and current harvest season structure are possible. For example, certain areas currently in the HEA may be able to support a harvest season that runs concurrent with the season in the EHA. Streamlining the seasons in these areas would allow for more effective management while also eliminating confusion among hunters and trappers and streamlining enforcement. We will develop criteria to assess the feasibility of extending and/or altering any seasons. Such criteria would likely include occurrence or abundance data from harvest-independent surveys (*Strategy 1.1.3*) coupled with hunter and trapper season preferences. In addition, the criteria may include results from the demographic model developed under *Strategy 1.3.1*. By incorporating expected harvest pressure into the demographic model, we can estimate population-level impacts of extended harvest seasons.

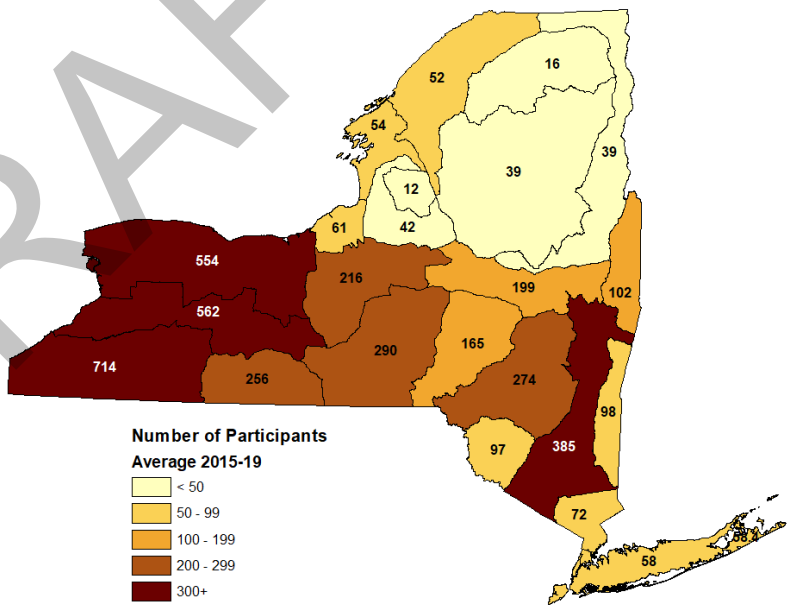

Figure 24. Average number of participants in the Bowhunter Sighting Log by wildlife management aggregate, 2015-2019.

New York's 2012–2017 Bobcat Management Plan outlined criteria for identifying and assessing potential new areas for harvest opportunities. These criteria relied on observation rates at the WMUA- and WMU-scale as reported in the Bowhunter Sighting Log and Trapper Survey. While these observation rates work well for certain areas with sizable numbers of participating hunters and trappers, they are dependent on participation, which varies greatly by region (Figure 24). Areas with low participation will inherently have fewer observations per square mile, even if the bobcat population is robust. While DEC will continue to monitor observation data reported through the Bowhunter Sighting Log and Trapper Survey to track trends, we will also assess the feasibility of using occupancy and/or abundance estimates from

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non-harvest-based survey methods (*Strategy 1.1.3)* to evaluate the feasibility of opening additional harvest opportunities.

GOAL 3. Ensure that DEC is meeting public desire for information about bobcats and their conservation, use, and enjoyment.

Objective 3.1: Conduct outreach to increase public understanding, appreciation, and support of bobcats as a sustainable wildlife resource in New York State.

- *Strategy 3.1.1.* Maintain and update a bobcat profile on DEC's public web site that provides information on the status, natural history, and management of bobcat in New York.

- *Strategy 3.1.2.* Create a publicly accessible presentation discussing bobcat life history, ecology, and management in New York.

  Beyond regulations, DEC will strive to enhance the public's knowledge and awareness of bobcat resources and management in New York. A bobcat profile will be maintained on the public web site that provides information on the status, natural history, and management of bobcat in New York. Department personnel will engage the public, when appropriate and feasible, and provide information concerning bobcat populations and management. These events may include fairs, schools, trapper meetings, and other public events as requested as well as informal contacts via phone, e-mail, and in-person office visits.

Objective 3.2: Evaluate DEC's bobcat management strategy and the satisfaction of bobcat harvesters, wildlife enthusiasts, and the general public with bobcat management in New York.

- *Strategy 3.2.1.* Assess public values and attitudes concerning furbearer management, including bobcats, and harvest management.

  In order to meet the Goals of the Bureau of Wildlife, DEC will solicit input from stakeholders to further inform management decisions. Some stakeholders, such as wildlife viewers and trappers, may have competing objectives. Balancing these competing objectives is even more difficult when the species is elusive in nature, giving the public the perception that the species may be endangered rather than abundant. The Department will keep this in mind and provide facts and information known about the species so that people taking the survey may make informed, fact-based decisions.

Objective 3.3: Compile information on bobcat-human interactions and develop guidelines and outreach items that provide information on bobcats and how to avoid conflicts with this species.

- *Strategy 3.3.1.* Continue to record reports of bobcat-human interactions in the Wildlife Damage Database and issue permits authorizing the removal of problem animals, if warranted.

- *Strategy 3.3.2.* Continue to develop and update standard staff responses and guidelines for responding to and resolving negative bobcat-human interactions.

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- *Strategy 3.3.3.* Work with the Northeast Fur Resources Technical Committee to maintain a regional database of incidents where human-bobcat interaction occurs.

  Negative bobcat-human interactions are very uncommon, but they do occur. The Wildlife Damage Database has been established to track wildlife complaints in a consistent manner across the state. When complaints are received, we will continue to record reports in the Wildlife Damage Database. We will review complaints on an annual basis to look for trends or opportunities for outreach and education. Guidance on co-existing with wildlife and education on the species will be provided to the public when they call with concerns. When necessary, the Department will issue permits to remove individual problem animals. Bobcats removed on a nuisance permit must be surrendered to the Department. The Department will utilize these animals by collecting biological data and utilizing the pelt for educational purposes.

  We will develop standard guidelines and staff responses to address a variety of potential situations that could result in negative bobcat-human interactions. Guidelines will include species information, bobcat-human interaction scenarios and response protocols, seasonal trends, and documentation procedures. This document will be updated periodically to remain current.

  Representatives of DEC's Furbearer Management Team actively participate on the Northeast Fur Resources Technical Committee, part of the Northeast Association of Fish & Wildlife Agencies. Information on New York State human-bobcat interactions will be provided for entry into the regional database of incidents on an annual basis.

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5.0 LITERATURE CITED

Anderson, E.M. 1987. Critical review and annotated bibliography of the literature on the bobcat. Colorado Division of Wildlife Special Report No. 62.

Association of Fish & Wildlife Agencies [AFWA]. 2020. Best management practices for trapping bobcats in the United States. Available for download at: https://www.fishwildlife.org/application/files/9216/0988/4524/Bobcat_BMP_2020.pdf.

Bailey, T.N. 1974. Social organization in a bobcat population. Journal of Wildlife Management 38:435-446.

Bailey, T.N. 1979. Den ecology, population parameters and diet of eastern Idaho bobcats. Pages 62-69 *in* P.C. Escherich and L. Blum (eds). Proceedings of the 1979 bobcat research conference. National Wildlife Federation Science and Technology Series 6.

Bailey, T.N. 1981. Factors of bobcat social organization and some management implications. Pages 984-1000 *in* J.A. Chapman and D. Pursley (eds). Proceedings of the worldwide furbearer conference. Frostburg, Maryland, USA.

Berg, W.E. 1979. Ecology of bobcats in northern Minnesota. Pages 55-61 *in* P.C. Escherich and L. Blum (eds). Proceedings of the 1979 bobcat research conference. National Wildlife Federation Science and Technology Series 6.

Buskirk, S.W. 2000. Habitat fragmentation and interspecific competition: implications for lynx conservation. Pages 83-100 *in* L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires (eds). Ecology and Conservation of Lynx in the United States. Gen. Tech. Rep. RMRS-GTR-30WWW. Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Carroll, R.P., M.K. Litvaitis, T. Foxall. 2021. Bobcat hair cortisol correlates with land use and climate. Journal of Wildlife Management 85:772-781.

Caswell, H. 2001. Matrix Population Models: construction, analysis, and interpretation. Sinauer Associates, Inc Publishers. Sunderland, MA, USA. 722 pp.

Connor, P.F. 1971. The mammals of Long Island, New York. New York State Museum and Science Service, Bulletin 416. Albany, NY. 78 pp.

Crowe, D.M. 1975. Aspects of aging, growth, and reproduction of bobcats from Wyoming. Journal of Mammalogy 56:177-198.

Deems, E.F. and D. Pursley. 1978. North American furbearers, their management, research, and harvest status in 1976. The International Association of Fish and Wildlife Agencies, Washington, D.C.

Dekay, J.E. 1842. Zoology of New York. Pt. 1, Mammalia. Albany, NY. 146 pp.

Duke, K.L. 1954. Reproduction in the bobcat *Lynx rufus*. Anatomical Record 120:816-817.

DRAFT

Erickson, A.W. 1955. An ecological study of the bobcat in Michigan. M.S. Thesis, Michigan State University, East Lansing, USA.

Fedriani, J.M., T.K. Fuller, R.M. Sauvajot, and E.C. York. 2000. Competition and intraguild predation among three sympatric carnivores. Oecologia 125:258-270.

Foot, L.E. 1945. Sex ratio and weights of Vermont bobcats in autumn and winter. Journal of Wildlife Management 9:326.

Fox, L.B. 1990. Ecology and population biology of the bobcat, *Felis rufus*, in New York. PhD Dissertation, State University of New York, College of Environmental Science and Forestry, Syracuse, USA.

Fox, L.B. and R.H. Brocke. 1983. Biology, ecology and range of the bobcat (*Lynx rufus*) in New York and its inferred interactions with potentially reintroduced lynx (*Lynx canadensis canadensis*) in Adirondack Park. Adirondack Wildlife Research Project Reports Funded by the Pittman-Robertson Act. Paper 17. <http://digitalcommons.esf.edu/awrpr/17>.

Fredrickson, L.F. and L.A. Rice. 1979. Bobcat management survey study in South Dakota, 1977-79. Pages 32-36 *in* P.C. Escherich and L. Blum (eds). Proceedings of the 1979 bobcat research conference. National Wildlife Federation Science and Technology Series 6.

Fritts, S.H. 1973. Age, food habits, and reproduction in the bobcat (*Lynx rufus*) in Arkansas. M.S. Thesis, University of Arkansas, Fayetteville, USA.

Fuller, T.K., S.L. Berendzen, T.A. Decker, and J.E. Cardoza. 1995. Survival and cause-specific mortality rates of adult bobcats (*Lynx rufus*). American Midland Naturalist 134:404-408.

Fuller, T.K., W.E. Berg, and D.W. Kuehn. 1985. Bobcat home range size and daytime cover-type use in north-central Minnesota. Journal of Mammalogy 66:568-571.

Gashwiler, J.S., W.L. Robinette, and O.W. Morris. 1961. Breeding habits of bobcats in Utah. Journal of Mammalogy 42:76-84.

Gilbert, J.H. and L.B. Keith. 2001. Impacts of reintroduced fishers on Wisconsin's bobcat populations. Pages 18-31 *in* A. Woolf, C.K. Neilsen, and R.D. Bluett (eds). Proceedings of a symposium on current bobcat research and implications for management. The Wildlife Society 2000 Conference, Nashville, Tennessee, USA.

Gipson, P.S. and J. Kamler. 2002. Bobcat killed by a coyote. Southwestern Naturalist 47:511-513.

Hamilton, D.A. 1982. Ecology of the bobcat in Missouri. M.S. Thesis, University of Missouri, Columbia, USA.

Hughes, A.M., D.M. Reding, S.A. Tucker, T.E. Gosselink and W.R. Clark. 2019. Dispersal of juvenile bobcats in a recolonizing population. Journal of Wildlife Management 83:1711-1719.

DRAFT

Karpowitz, J.F. 1981. Home range and movements of Utah bobcats with reference to habitat selection and prey base. M.S. Thesis, Brigham Young University, Provo, Utah.

Knick, S.T. 1990. Ecology of bobcats relative to exploitation and a prey decline in southeastern Idaho. Wildlife Monographs 108:1-42.

Knick, S.T., J.D. Brittell, and S.J. Sweeney. 1985. Population characteristics of bobcats in Washington state. Journal of Wildlife Management 49:721-728.

Knowles, P.R. 1985. Home range size and habitat selection of bobcats, *Lynx rufus*, in north-central Montana. Canadian Field-Naturalist 99:6-12.

Lembeck, M. 1986. Long term behavior and population dynamics of an unharvested bobcat population in San Diego County. Pages 305-310 *in* S.D. Miller and D.D. Everett (eds). Cats of the World: Biology, Conservation, and Management. National Wildlife Federation, Washington, D.C., USA.

Lembeck, M. and G.I. Gould, Jr. 1979. Dynamics of harvested and unharvested bobcat populations in California. Pages 53-54 *in* P.C. Escherich and L. Blum (eds). Proceedings of the 1979 bobcat research conference. National Wildlife Federation Science and Technology Series 6.

Lenarz, M.S., M.E. Nelson, M.W. Schrage, A.J. Edwards. 2009. Temperature mediated moose survival in northeastern Minnesota. Journal of Wildlife Management 73:503-510.

Leslie, P.H. 1945. On the use of matrices in certain population mathematics. Biometrika 33:183-212.

Leslie, P.H. 1948. Some further notes on the use of matrices in population mathematics. Biometrika 35:213-245.

Litvaitis, J.A., J.A. Sherburn, M. O'Donoghue, and D. May. 1982. Cannibalism by a free-ranging bobcat, *Felis rufus*. Canadian Field-Naturalist 96:476-477.

Litvaitis, J.A., C.L. Stevens, and W.W. Mautz. 1984. Age, sex, and weight of bobcats in relations to winter diet. Journal of Wildlife Management 48:632-635.

Lovallo, M.J. 1999. Multivariate models of bobcat habitat selection for Pennsylvania landscapes. Ph.D. Dissertation, Pennsylvania State University, University Park, USA.

Lovallo, M.J. and E.M. Anderson. 1996a. Bobcat (*Lynx rufus*) home range size and habitat use in northwest Wisconsin. American Midland Naturalist 135:241-252.

Lovallo, M.J. and E.M. Anderson. 1996b. Bobcat movements and home ranges relative to roads in Wisconsin. Wildlife Society Bulletin 24:71-76.

Maehr, D.S. and J.R. Brady. 1986. Food habitats of bobcats in Florida. Journal of Mammalogy 67:133-138.

McCord, C.M. 1974. Selection of winter habitat by bobcats (*Lynx rufus*) on the Quabbin Reservation, Massachusetts. Journal of Mammalogy 55:428-437.

DRAFT

McCord, C.M. and J.E. Cardoza. 1982. Bobcat and lynx (*Felis rufus* and *F. lynx*). Pages 728-766 *in* J.A. Chapman and G.A. Feldhamer (eds.). Wild mammals of North America: biology, management, and economics. Johns Hopkins University Press, Baltimore, Maryland, USA.

Merrill, F.J.H. 1899. Preliminary list of the mammals of New York. Bulletin of the New York State Museum. Circ. 25:292-390.

Merriam, C.H. 1882. The vertabrates of the Adirondack region, northeastern New York. Trans. Linnaean Society of New York. Vol 1. 106 pp.

Moen, A.N. 1976. Energy conservation by white-tailed deer in the winter. Ecology 57:192-198.

Neilsen, C.K. and A. Woolf. 2001. Bobcat habitat use relative to human dwellings in southern Illinois. Pages 40-44 *in* A. Woolf, C.K. Neilsen, and R.D. Bluett (eds.). Proceedings of a symposium on current bobcat research and implications for management. The Wildlife Society 2000 Conference, Nashville, Tennessee, USA.

New York State Department of Environmental Conservation [NYSDEC]. 1995. Status and Management of Bobcat in New York. Bobcat Work Group of the Furbearer Management Team. Albany, NY. 40 pp.

NYSDEC. 2012. Management Plan for Bobcat in New York State 2012-2017. Albany, NY. 28pp.

NYSDEC. 2021. Observed and Project Climate Change in New York State: An Overview. Albany, NY. 38 pp.

Peers, M.J.L., Y.N. Majchrzak, A.K. Menzie, E.K. Studd, G. Bastille-Rousseau, R. Boonstra, M. Humphries, T.S. Jung, A.J. Kenney, C.J. Krebs, D.L. Murray and S. Boutin. 2020. Climate change increases predation risk for a keystone species of the boreal forest. Nature Climate Change 10:1149-1153.

Pennsylvania Game Commission. 2013. Bobcat (*Lynx rufus*) Management in Pennsylvania (2013-2022). Harrisburg, PA. 62 pp.

Pollack, E.M. 1951. Observations on New England bobcats. Journal of Mammalogy 32:356-358.

Riley, S.P.D., R.M. Souvajot, T.K. Fuller, E.C. York, D.A. Kamradt, C. Bromley, R.K. Wayne. 2003. Effects of urbanization and habitat fragmentation on bobcats and coyotes in southern California. Conservation Biology 17:566-576.

Roberts, N.M. and S.M. Crimmins. 2010. Bobcat population status and management in North America: evidence of large-scale population increase. Journal of Fish and Wildlife Management 1:169-174.

Roberts, N. 2010. Enhancing furbearer management in New York. PhD dissertation. Cornell University, Ithaca, NY. 86 pp.

Rolley, R.E. 1985. Dynamics of a harvested bobcat population in Oklahoma. Journal of Wildlife Management 49:283-292.

DRAFT

Rounsville, T.F. Jr. 2018. The bobcats of West Virginia: how many and where are they? PhD dissertation. West Virginia University, Morgantown, WV, USA. 195 pp.

Severinghaus, C.W. and C.P. Brown. 1956. History of the white-tailed deer in New York. N.Y. Fish and Game Journal 3:129-167.

Stys, E.D. and B.D. Leopold. 1993. Reproductive biology and kitten growth of captive bobcats in Mississippi. Proceedings of the Southeastern Association of Fish and Wildlife Agencies 47: 80-89.

Sun, C.C., J.A. Royle, and A.K. Fuller. 2019. Incorporating citizen science data in spatially explicit integrated population models. Ecology 100: e02777.

Tigas, L.A., D.H. Van Vuren, and R.M. Souvajot. 2002. Behavioral responses of bobcats and coyotes to habitat fragmentation and corridors in an urban environment. Biological Conservation 108:299-306.

Tucker, S.A., W.R. Clark, and T.E. Gosselink. 2008. Space use and habitat selection by bobcats in the fragmented landscape of south-central Iowa. Journal of Wildlife Management 72:1114-1124.

Tumlison, R. and V.R. McDaniel. 1988. Sex ratios in bobcat populations. Journal of the Arkansas Academy of Science 42:92-95.

Van den Brink, N.W., Elliott, J.E., Shore, R.F. and Rattner, B.A. eds., 2018. Anticoagulant rodenticides and wildlife (Vol. 5). NY: Springer International Publishing.

Vermont Fish and Wildlife Department. 2016. An assessment of the status and harvest trends of river otter and bobcat in Vermont. Report for the Vermont Fish and Wildlife Board. Montpelier, VT, USA. 44 pp.

Young, S.P. 1958. The Bobcat of North America. The Stackpole Company, Harrisburg, PA and the Wildlife Management Institute, Washington, D.C. 193 pp.

Zezulak, D.S. 1981. Northeastern California bobcat study. California Department of Fish and Game Report, Federal Aid Wildlife Restoration Project W-54-R-R, Job IV-3.

Zezulak, D.S. and R.G. Schwab. 1979. A comparison of density, home range, and habitat utilization of bobcat populations at Lava Beds and Joshua Tree National Monuments, California. Pages 74-79 *in* P.C. Escherich and L. Blum (eds.). Proceedings of the 1979 bobcat research conference. National Wildlife Federation Science and Technology Series 6.

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6.0 APPENDICES

Appendix I. Legal Matters

Furbearer management occurs within the authority provided by the Environmental Conservation Law (ECL). The ECL is the domain of the New York State Legislature. The ECL grants authority to DEC to establish regulations for some, but not all, aspects of furbearer management. The public is often confused by the distinction between statutes (i.e., ECL) and regulation and mistakenly believe that DEC has full control of all aspects of furbearer management. This section outlines items where amendment of the ECL is desirable to improve DEC's ability to manage bobcats.

1. ***Pursue revisions to the statutory authority in ECL 11-0905(3) governing the harvest of bobcats that requires concurrent hunting seasons during open trapping seasons. Alternatively, pursue regulation changes restricting method of take for hunting seasons.***

   ECL 11-0905(3) requires the Department to provide a concurrent hunting season anywhere there is an open trapping season for bobcat. At times, the separation of these two activities is desirable, such as allowing trapping while restricting hunting during an open firearms deer season. Bobcat shot incidental to deer hunting are often harvested with firearms that may not allow for full utilization of the pelts.

   The Department does not have authority to amend laws and must rely on the Legislature to do so. Regulations governing methods of take (caliber or shot size restrictions) may be considered to help promote responsible use of bobcats taken by hunters, but such regulations may be challenging from a compliance and enforcement perspective, so a decoupling of bobcat hunting and trapping in law would provide a better solution.

Appendix II. Wildlife Health Program

The Department's Wildlife Health Unit has written a comprehensive Wildlife Health Program Strategic Plan (NYSDEC 2011). This will allow the Department to respond effectively to health issues involving free-ranging wildlife, as well as minimizing the negative impacts of wildlife health issues affecting domestic animals and humans. The Department collaborates with the Departments of Health and Agriculture & Markets under the umbrella of the "One Health" concept to address issues affecting people and animals in their environment. The Wildlife Health Program integrates statewide wildlife health activities into a single unified program to address all wildlife health issues including providing diagnostic services, disease response and prevention, and a suite of wildlife veterinary services.

The Wildlife Health Program will assist bobcat management efforts by performing necropsies, identifying the cause of death, disease diagnosis, conducting wildlife health-related investigations, assisting in research design and supporting regional and national bobcat research and/or classroom/laboratory exercises. Bobcat carcasses are typically submitted by DEC staff for necropsy if the cause of death is unclear. In addition, all sick or abnormal acting bobcats reported to the Department should be submitted for necropsy.

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Appendix III. Furbearer Possession Tag

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Furbearer Possession Tag

Current version: Fall 2022

First Name ______________________ **Last Name** ______________________

Date of Birth (mm/dd/yy) __ __ / __ __ / __ __ **ID #** (from license) __ __ __ __ - __ __ __ __ - __ __ __ __

1. Complete this tag immediately upon arrival at your mode of travel, camp or home, whichever occurs first.
2. This tag is not an official pelt seal, but must accompany your pelt or unskinned animal at all times.
3. This tag allows you (the taker) to legally possess the pelt or unskinned animal until sealing is required.
4. The pelt or unskinned animal must be sealed before: (a) it may be exported from New York State; (b) sold or transferred to another's possession; (c) mounted or processed; or (d) the end of the tenth day after the close of the season in the Wildlife Management Unit (WMU) where it was taken, whichever comes first.
5. Be sure your 12-digit trapping or hunting ID # is recorded above.
6. For fields below: SEX : M = Male, F = Female, U = Unknown and TAKE: T = Trapped, H = Hunted, R = Road Killed.

Species Taken: Only **ONE SPECIES** may be used **ON THIS TAG**

O Fisher O Marten (Season limit of 6) O Otter O Bobcat (may be hunted)

Date Taken (mm/dd/yy)	County (first 4 letters)	Town (first 7 letters)	WMU	Sex	Take	Seal Number (DEC use only)
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	
__ / __ / __				O M O F O U	O T O H O R	

Region	Date Sealed (mm/dd/yy)	Badge/Sealer#	DEC use only
	__ / __ / __		

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Appendix IV. Guide to Determining the Sex of Furbearers

Guide to Determining the Sex of Furbearers

Sex of harvested furbearers is essential information that is collected by DEC for certain species (bobcat, otter, fisher, and marten). This information is used to determine sex ratios of harvested populations, which helps us better estimate population trends. Deviations from predicted sex ratios may indicate overharvest of a population, potentially resulting in season restrictions. Therefore, it is critical that trappers accurately provide this information on Furbearer Possession Tags.

The easiest way to sex most species of furbearers is to feel for the presence of a baculum, or penis bone, which is present in males. Of the 16 furbearer species in New York, 14 have a baculum that can be felt with a quick physical examination.

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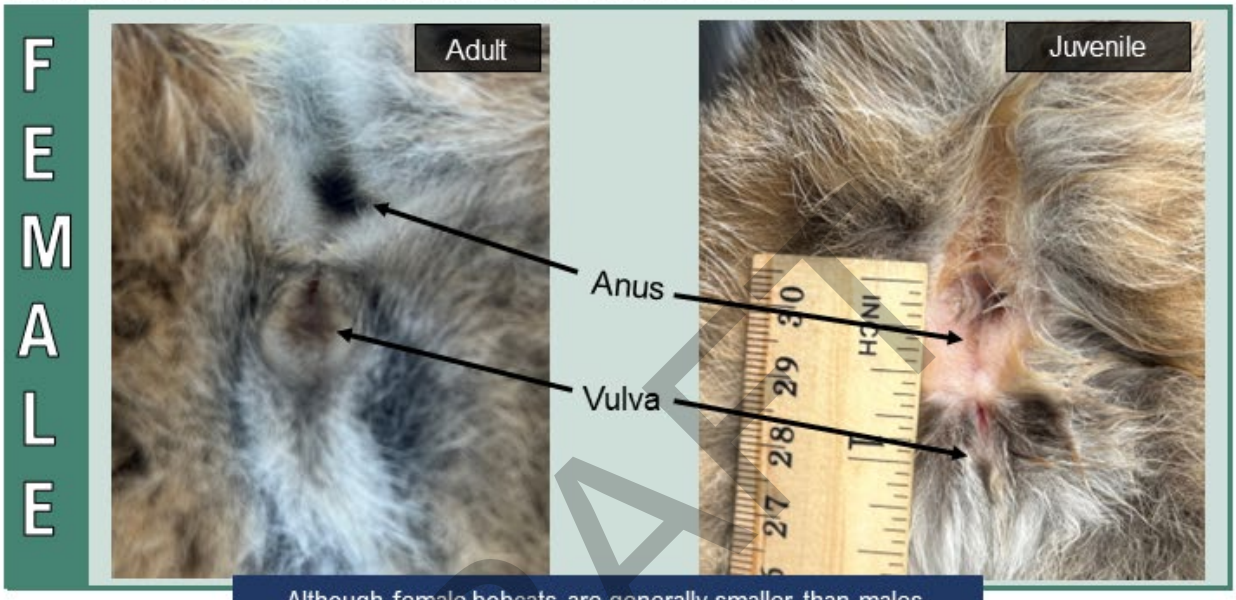
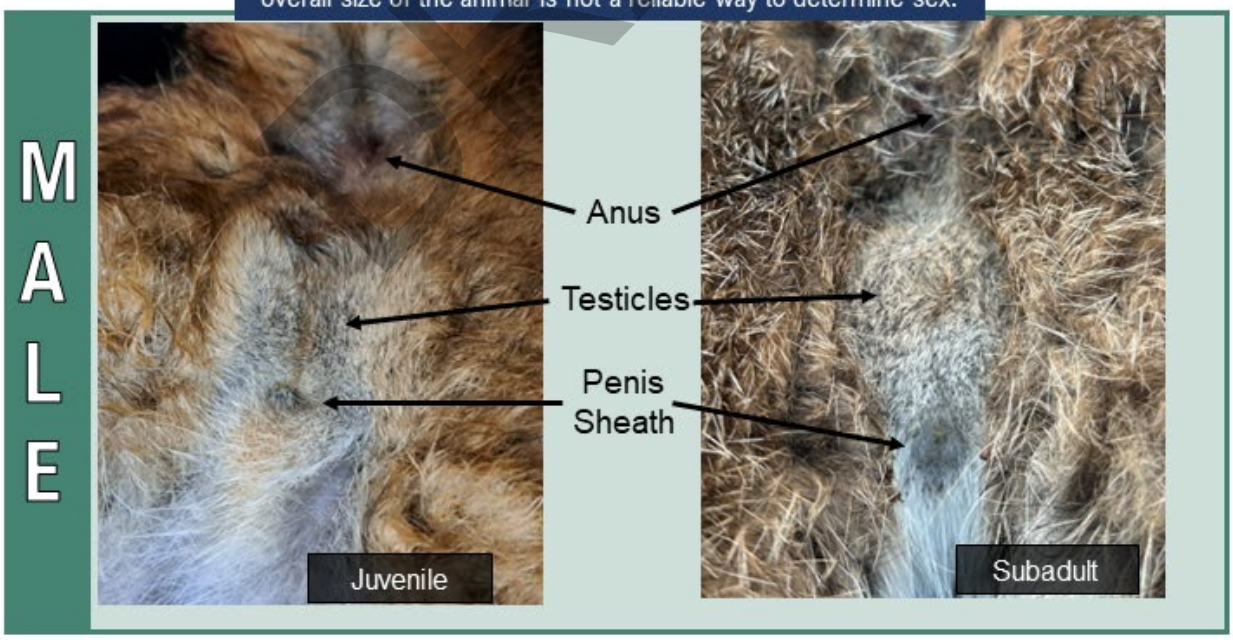
Sexing Bobcats

The baculum in bobcats is unable to be felt externally and cannot be used to determine sex. Males do have testes that can be felt, but they are very small (about the size of peas) in juveniles. The most reliable way to sex a bobcat is to look at the distance between the anus and the genitalia. Males have a larger distance between the anus and the penis sheath, with the testicles found between the two. In contrast, the female's vulva is located directly beneath the anus.



Although female bobcats are generally smaller than males, overall size of the animal is not a reliable way to determine sex.



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Appendix V. Bobcat Season Start Date Preferences

In fall 2017, a survey was sent to 4,500 trappers and hunters to assess their preferences for the timing of furbearer seasons and to determine what factors have the greatest influence on their season timing preferences. Survey recipients were comprised of randomly selected licensed trappers (80%) and participants in DEC's Small Game Hunter Survey or Trapper Survey who indicated that they hunt furbearers and would be willing to participate in a survey about season timing (20%). We asked survey respondents to select their preferred season start dates from four proposed dates for each species and zone (Northern Zone or Southern Zone).

Of the 2,105 respondents, 34% had pursued bobcats in the last 5 years; 64% had attempted to trap bobcats while 36% had hunted bobcats. When asked their preferred season start date, the majority of both trappers and hunters selected the current season start date of October 25 (Table A1). This preference was much more pronounced with bobcat hunters than bobcat trappers.

Table A1. Season start date preferences of bobcat trappers and hunters, as asked on a 2017 season preference survey.

Season Start Date	NZ Bobcat Trappers (n=181)	SZ Bobcat Trappers (n=313)	NZ Bobcat Hunters (n=93)	SZ Bobcat Hunters (n=166)
Oct. 25	36%	39%	53%	49%
Nov. 1	33%	26%	16%	13%
Nov. 15	18%	17%	13%	16%
Dec. 1	11%	16%	15%	15%
No answer	2%	3%	3%	7%

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To better understand what drives season date preferences, participants were also asked to rank the importance of six factors: youth opportunity, pelt quality, access (weather-related), time limitations (personal factors), conflicts with other users, and alignment with other furbearer seasons. Both trappers and hunters ranked pelt quality as the most important factor related to season timing, and ranked conflicts with other users as the least important. For bobcat, the preferred start date selected by respondents did not align with how the different factors were ranked. For example, a majority of respondents ranked pelt quality as the most important factor driving trapping/hunting satisfaction, but also indicated a preference for a season start date of October 25th or earlier, despite the fact that a later season start date would be better aligned with higher pelt quality. It is conflicting values like these that illustrate the complexity of the season setting process and emphasize the need to look at both season date preference and hunter or trapper values in combination rather than using just one or the other to arrive at a final decision for the optimal season timing.

To address both date preferences and values, we used a decision-making process that incorporated the following factors to identify the season start dates that best balanced the competing values of trappers/hunters:

- Trapper/Hunter Season Date Preference
- Maximize pelt quality
- Maximize access (weather-related)
- Maximizing youth opportunities
- Maximize alignment with other furbearer seasons
- Minimize time limitations (personal factors)
- Minimize conflicts with other users

Each of these factors were weighted in terms of their relative importance as identified by survey respondents to determine the “best” season start date. We placed 40% of the weight of the decision on trappers’ or hunters’ season date preference. The remaining 60% of the decision was placed on the other six factors. We assigned a relative importance or weight to each factor based on how survey respondents ranked those six factors from “most important” to “least important”. Since the relative importance of the six factors varies by species and zone, we calculated unique weights for the six factors for each species/zone combination (e.g., Northern Zone Fisher, Southern Zone Fisher, etc.).In general, across all species and zones, roughly 20% of the weight of the decision was placed on pelt quality, 8-10% of the weight was placed on access, time limitations, alignment with other fur seasons, and youth opportunity, and about 5% of the weight was placed on conflicts with other users.

For both bobcat hunting and trapping in the northern and southern zones, the season start date that best balanced respondents’ season date preferences and other factors was the status quo (Figure 1).

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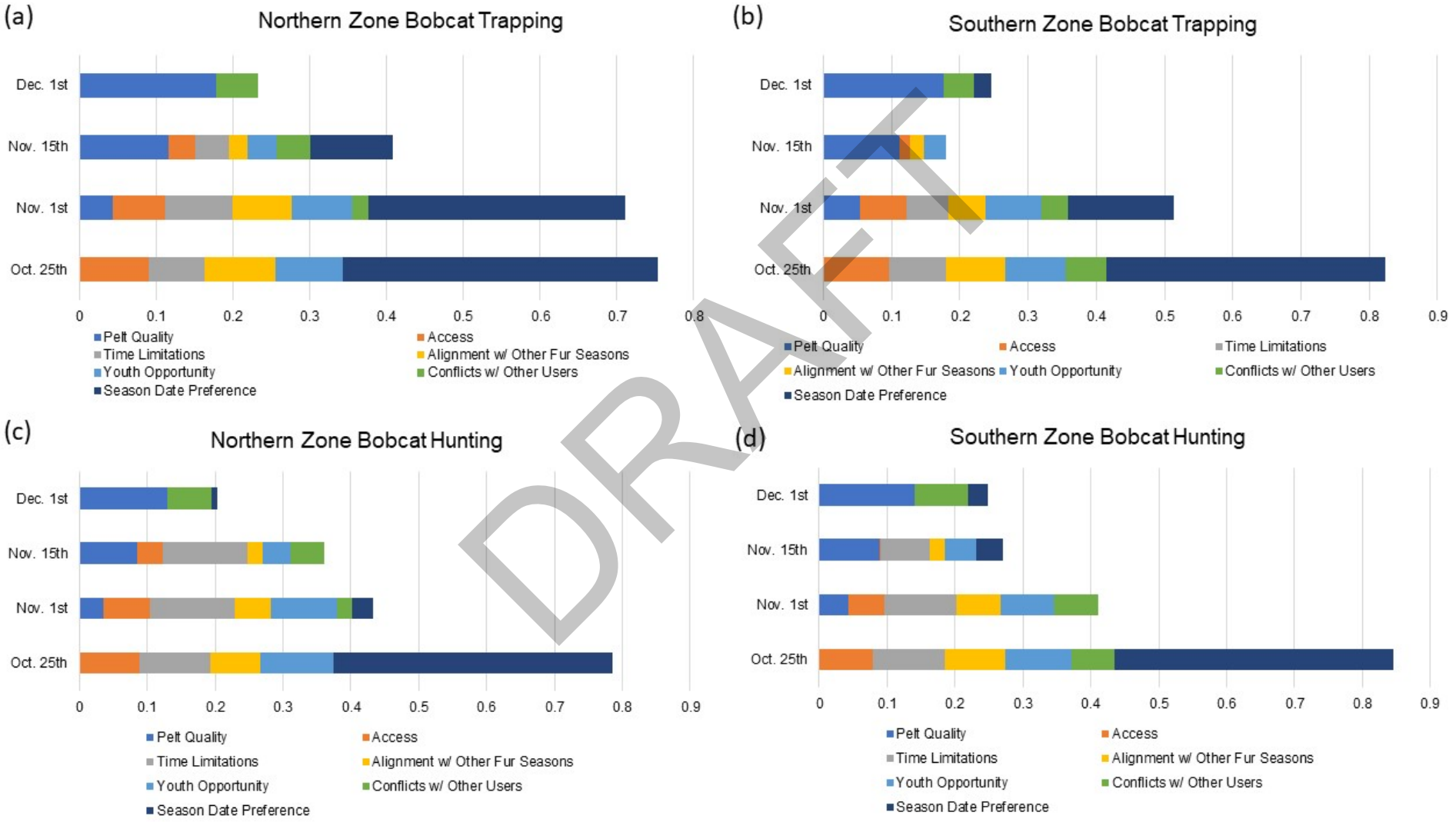
Figure A1. Results of season start date decision-making process for bobcats. Licensed trappers and furbearer hunters were asked to identify what values impacted their season date preferences; these values were weighted based on the responses and used to select the 'optimal' season start date.



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