

MASSACHUSETTS WILDLIFE

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**Kestrel Conservation,
Outdoor Safety for All,
Western Mass. Duck Hunters**

Governor Healey signs Biodiversity Executive Order



In September, conservation partners gathered at MassWildlife's Field Headquarters in Westborough to celebrate as Massachusetts Governor Maura Healey signed Executive Order No. 618 on Biodiversity Conservation. This order directs the Department of Fish and Game, of which MassWildlife is a part, to set biodiversity goals for 2030, 2040, and 2050. Massachusetts is the first state to set metrics out to 2050, and the first on the East Coast to include coastal and marine biodiversity.

The 2019 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services estimated that three-quarters of the world's land surface and 66 percent of its oceans had been significantly altered, and one million species face extinction within decades. Climate change is accelerating this decline, negatively affecting public health, the economy, and food security.

Massachusetts' oceans, rivers, forests, marshes, and conserved lands are critical natural assets for the regional economy and reducing the effects of climate change. Threats to biodiversity include habitat loss and fragmentation, infrastructure, pollution, climate change impacts, and invasive species. Currently, there are over 430 species listed under the Massachusetts Endangered Species Act. This executive order elevates the importance of protecting biodiversity as a long-term investment in the health, economy, and climate resilience of Massachusetts.

The first step will be for the Department of Fish and Game to conduct a review of existing biodiversity conservation efforts and establish goals and strategies to achieve a nature-positive future for Massachusetts. Goals will focus on sustaining a full array of plants, animals, and habitats to survive and flourish while providing equitable access to nature and ensuring a climate-resilient landscape for the future. The results of this review and recommendations will be presented to the Governor's office within the next 6 months.

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On the Cover: There is, perhaps, no better image to illustrate the role people can play in the conservation of the American kestrel (*Falco sparverius*) than this male chick, near fledging age, hatched from a land trust's nest box, and calmly sitting in hand on the day it was banded. Photo © Rob Aberg

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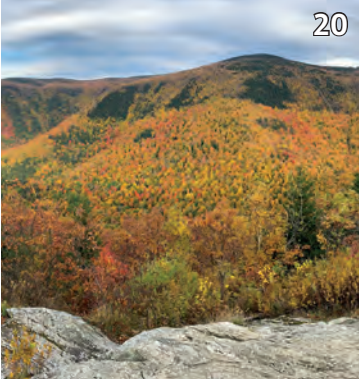


Photo courtesy: WMDH



Photo by Troy Gipps/MassWildlife



THE KESTREL CONUNDRUM

Photo by Troy Gipps

Editor's Note: The marked decline of the American kestrel throughout the United States in recent decades has ornithologists investigating a slew of potential causes while working closely with a variety of partners to establish nest box programs across the species' range. In Part 1 of this story, the editor, a land trust volunteer, describes the process of establishing and managing a successful kestrel nest box program, and, in Part 2, MassWildlife's State Ornithologist provides the statewide perspective on the conservation of this falcon, including the technology being deployed to learn more about its lifecycle.

PART 1 A HOME FOR KESTRELS

By Troy Gipps

It happened again last spring. I was carrying my 16-foot ladder ever so quietly through thigh-high grass while approaching one of 10 nest boxes I maintain in the Town of Grafton, when a female American kestrel (*Falco sparverius*) shot out of the entrance hole and took flight. Klee-klee-klee-klee, klee-klee-klee, she called, while climbing to soar above me. Like the eight other pairs of nesting adults I had encountered over the previous eight years, she was surprisingly tolerant of my visit. Her presence in the box was a great sign. It was mid-May, which meant she might be tending her clutch. I excitedly ascended the ladder, turned the two wingnuts that secure the nest box door, and slowly lifted it to find five tan-colored, speckled kestrel eggs nestled neatly together in a circle on the bed of wood shavings I had placed in the box a month earlier. It was a proud and familiar "Kestrel Dad" moment for me. The actual kestrel dad was perched on a dead tree, patiently watching from a nearby wetland.

I got involved with kestrel conservation after attending the Massachusetts Land Trust Coalition's annual conference in Worcester in the summer of 2014, where I learned that kestrels were experiencing a precipitous decline across their range. I was representing the Grafton Land Trust (GLT) at the conference, a private non-profit member-supported organization I had been volunteering with for over a decade, and I was looking for a new conservation project we could implement on

our properties. Not surprisingly, the idea that we could help falcons was immediately appealing.

The American kestrel, sometimes called the sparrow hawk, occupies an interesting niche among raptors. It's a fierce predator that thrives in open habitat that includes grasslands, meadows, and even urban areas dominated by human structures. Its generalist diet includes large insects, like grasshoppers and dragonflies, and vertebrates, including small snakes, rodents, and birds. To better locate prey, kestrels have evolved the ability to see ultra-violet light, allowing them to detect urine trails left by rodents. Additionally, it's a cavity nester, but it has no ability to excavate cavities and does not bring any nesting material into the existing cavities it selects. Finally, it is the smallest raptor in North America, weighing only slightly more than a blue jay. Its diminutive size makes it potential prey for larger birds, such as hawks, owls, and even crows.

As for looks, it's tough to beat the beauty of a kestrel in the world of raptors. Males wear rust-colored feathers on their backs, each tipped with black, a pattern that continues on their tail feathers, giving them a prominent black band at the tail's base. The two black slashes on the male's face are fitting warpaint for this fierce hunter and are present but slightly less prominent on the female. The male's crown and wings are uniquely slate-blue. Females (shown above) have a gray crown topped with rusty feathers and are rusty overall with black barring on their wings, backs, and tails. Black dots appear in vertical lines along the side of the male's chest. The female's chest is light in color with rusty-tan spots.

Following the MLTC conference, I took a walk on a conservation property in Grafton with large areas of open field, and I could quickly see how a kestrel would



Photo MassWildlife Archives/Bill Byrne

have a hard time finding a suitable nest cavity that was safe from predation. Fields are, after all, open and mostly edged with forest across Massachusetts. Due to historical agricultural land-use practices across the state, it's uncommon to find mature trees with suitable nesting cavities within fields, where the open space surrounding the tree could provide some level of deterrence from predation. Simply put, a nest box atop a 16-foot, 4-inch-square post in the middle of a large open field and fitted with a predator guard is akin to a honeymoon suite at the Ritz-Carlton™ for a pair of kestrels.

I presented my kestrel project idea at the next GLT board meeting and the directors were all in favor. The next step was to determine where to place the boxes. Like many land trusts, most of our properties were forested, so rather than restrict the project to land trust properties only, I instead looked at a topographical map of the entire town and identified the largest areas of open space without regard to property ownership. Guidelines for nest box placement recommended habitat with

Guidelines for nest box placement recommended habitat with a minimum of 40 acres of open fields, which initially seemed like a tall order, but when adjacent parcels of open space were identified, several areas in town that could support nesting kestrels quickly became apparent.

a minimum of 40 acres of open fields, which initially seemed like a tall order, but when adjacent parcels of open space were identified, several areas in town that could support nesting kestrels quickly became apparent. I then sought the advice of select MassWildlife staff (I was not yet working for the agency) and invited them to walk a few GLT and Town of Grafton Conservation Commission properties I was considering. They confirmed that several of the locations met the baseline requirements for kestrels, so the chance of catching their attention with nest boxes was good if they were in the area. I contacted several private landowners and appeared before Grafton's Select Board to request permission to place nest boxes on sev-

eral properties managed by the conservation commission. In all cases, permission was granted. A mix of nine private, land trust, and town-owned properties would host our 10 nest boxes. The project had gained traction.

I again approached MassWildlife, this time regarding nest boxes, and they had some on hand that had been constructed by a partnering organization. I was able to get 10 boxes for our project. The next steps included purchasing the nest box poles (pressure-treated, 16-foot, 4-inch-square posts); sheet metal to wrap around each post about 18 inches below the nest box to prevent predators from climbing up the pole and accessing the box; the nuts and bolts to securely attach the boxes to the poles; aspen wood shavings for nesting substrate (purchased from a pet

store); and a lightweight, fiberglass 10-foot folding ladder to access and maintain the boxes. The GLT funded the purchase of these supplies, which cost about \$500. I got all the equipment organized and we put out the call to our membership and the community at large for volunteers. You see, installing a kestrel nest box is no easy task: think of it as a giant bird house, the base of which must be set 2½ to 3 feet into often rock-filled ground to keep it stable over time. Fortunately, 25 people stepped forward to enthusiastically participate with the nest box installation during a single weekend at the beginning of November 2014. The GLT also rented a gas-powered, posthole earth drill (auger) for the weekend, which I was able to tow

with my truck's trailer hitch. I arrived bright and early on that Saturday morning, with five of the nest boxes bolted to poles and strapped to my truck's bed racks. I gave a quick briefing to the volunteers, explaining the hard work that lay ahead and the way in which we needed to go about placing the boxes: setting the posts at the preferred depth of 3 feet, orienting the nest box entrance to the southeast, to maximize warmth from the sun while shielding the entrance from storms from the north; and setting them far enough from the forest edge to prevent flying squirrels from leaping from trees taller than the nest box poles and gliding onto and then into the boxes, where they could prey upon eggs or young chicks. But as I



Photo by Troy Gippis



Photos by Troy Gippis



stood there smiling and talking to our volunteers, I harbored a secret: I had never actually seen a kestrel. Not one, ever. I also had no formal ornithological training. What I did know was Grafton had suitable habitat, and there were certainly kestrels around, even if I hadn't seen or noticed them before. Those facts alone were reason enough for optimism. It was a "If you build it, [they] will come" moment. Over the next two days, we successfully installed all 10 nest boxes. The auger was a critical piece of equipment, as were rock bars, post hole diggers, shovels, and many gloved hands.

Winter rolled in about a month later and in early March we ran a volunteer orientation at the Community Barn in Grafton that was well attended. Our guest speaker that night was Joanne "Joey" Mason, president of Keeping Company

with Kestrels, a nonprofit dedicated to conducting research and education on raptors. Joey has run a kestrel nest box and banding project around cranberry bogs in southeastern Massachusetts since 1989. In addition to the valuable information she provided regarding the proper management of a kestrel nest box program, she brought along a male kestrel she had in her care. He was a handsome bird, and what a thrill it was for all of us to get a close look at the little falcon we would all be searching for when spring arrived.

At the end of April, as dawn began to illuminate the landscape around me, a bird landed on a limb less than five feet above my head. I was tucked into the bushes, wearing full camouflage, on the edge of a large field in Grafton on opening day of wild turkey season. The property now hosted two of our kestrel boxes. I slowly tipped my hat backward and looked up to see the underside of a kestrel sitting right above me—the first I had seen in the wild. "Perhaps they would, in fact, come," I thought.

Over the following two weeks I and fellow kestrel project volunteer and GLT member Christine Thurber monitored activity at our boxes and removed the nesting material of invasive species, such as European starlings and English sparrows. Then, on June 15, 2015, I opened a nest box to find our first clutch of four kestrel eggs. All four eggs hatched that first year and all the chicks fledged, which said a lot about the habitat, a 104-acre town-owned and conservation commission-managed parcel with large fields mowed on a delayed and alternating schedule to provide habitat for ground-nesting birds such as bobolink. The property also had a stream that was frequently impounded by beavers, which created 2–3 small ponds and wetland areas. Large fields were also present on neighboring private property. In each of the eight successive years, a pair of

kestrels would select this property as a nesting site. In 2016, both nest boxes there were occupied by kestrels. The only year without a nesting pair on this property was 2021, while at no time have kestrels selected a nest box at any of the other eight locations in Grafton. This underscores the importance of evaluating habitat on a landscape scale first, and then seeking landowner permission, when necessary. In total, as of 2023, 40 kestrel eggs were laid in 9 nestings over a 9-year period; 37 eggs have hatched, and 37 chicks were fledged.

A few years after the start of the project, Christine Thurber relocated for work reasons, and I continued to manage the project on my own. The reward, on a personal level, continues to be far greater than the time it takes to maintain the project. Each fall, I visit the nest boxes to remove wood shavings and any nesting material that may be present and make repairs, if needed. I return in mid-March to add fresh wood shavings, then monitor the boxes for activity, removing the nesting material of invasive species, and remaining ever hopeful that I will see a pair of kestrels perched atop a nest box. In return, my family, friends, fellow land trust volunteers, and I have had the great privilege of stepping into the world of the American kestrel, reaping memories that are priceless. The

project's success bolstered the visibility of the GLT in the community and educated the townspeople about kestrels through the GLT's membership outreach efforts and the many articles and photo essays that appeared in *The Grafton News*.

The GLT also works closely with Andrew Vitz, State Ornithologist for MassWildlife, to ensure our nesting data contributes to conservation efforts at state and regional levels. For the first eight years of the project, that entailed assisting Dr. Vitz with the banding of all our kestrel chicks and reporting our nesting success data. The bands contain a unique alphanumeric code that provides valuable movement data when recovered. But the recovery of kestrel bands is infrequent, so last year MassWildlife began using innovative radiotelemetry technology to track kestrels. The female from the GLT's successful nest in 2023 is now a part of this study. We are excited to see if she will return to Grafton next spring.

The efforts in Grafton are but a small part of what is happening across the state to conserve kestrels, so to better understand the challenges this species is facing and the work being done to reverse its population decline, we move on to Part 2 of this kestrel story, but first, a Grafton Land Trust kestrel project album.



Photo by Troy Gipps



KESTREL PROJECT



Photos © Troy Gipps



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PART 2

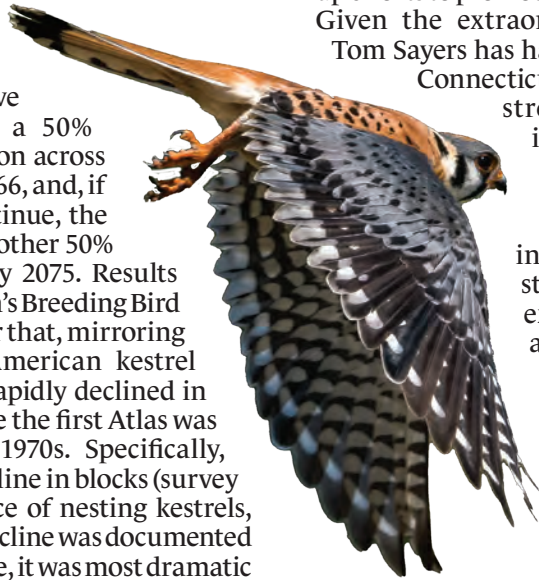
TRACKING KESTRELS TO PROMOTE CONSERVATION

By Andrew Vitz, Ph.D.

Historically, the American kestrel (*Falco sparverius*) has been very successful, as evidenced by its large breeding range, which includes much of the Americas from Alaska to the southern tip of South America. In fact, as little as a few decades ago, I recall commonly observing kestrels along highway edges, a habitat where I seldom see them today. That is a result of a widespread decline that has occurred in kestrel populations throughout the United States.

According to the North American Breeding Bird Survey, kestrels have experienced over a 50% decline in population across their range since 1966, and, if current trends continue, the species will lose another 50% of its population by 2075. Results from Mass Audubon's Breeding Bird Atlas 2 made it clear that, mirroring national trends, American kestrel populations have rapidly declined in Massachusetts since the first Atlas was completed in the 1970s. Specifically, there was a 57% decline in blocks (survey areas) with evidence of nesting kestrels, and although the decline was documented throughout the state, it was most dramatic in eastern Massachusetts. These declines could have been even more pronounced had it not been for long-term nest box programs by a few organizations and individuals to promote nesting kestrels.

Reasons for the decline are not well understood and researchers are currently evaluating several limiting factors, including habitat loss, nesting cavity scarcity, competition for nesting cavities, insecti-



cides, declines in prey abundance, West Nile Virus, fledgling mortality (particularly by increasing numbers of Cooper's hawks), and elevated mortality during migration or overwintering periods. Most likely, there is no real smoking gun, but rather several threats working together, resulting in the drop in population.

Due to this population decline, the American kestrel has been included as a Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan since the plan's initial publication in 2005. However, the species remains abundant enough to not warrant listing under the Massachusetts Endangered Species Act or the federal Endangered Species Act.

In an attempt to halt the kestrel population decline in the state, MassWildlife collaborated with Mass Audubon to ramp up efforts to promote kestrel conservation. Given the extraordinary success that

Tom Sayers has had with his Northeast Connecticut Kestrel Project, we

strongly believed that increasing the number of nesting boxes in suitable habitat was important to achieving our goals. The next step was to strengthen existing partnerships and build new ones to deploy additional nesting boxes both on state and privately owned properties. These partners included the Massachusetts Department of Transportation, the

Massachusetts Department of Conservation and Recreation, and several nonprofit organizations. Land trusts have been some of our most important partners, including the Kestrel Land Trust, the East Quabbin Land Trust, the Grafton Land Trust (as described in Part 1 of this article), and the 300 Committee (Falmouth). Each of these land trusts deployed kestrel boxes on their properties



A banded American kestrel chick.

and organized a volunteer base to monitor boxes for nesting success. Being in ideal landscapes with high densities of kestrels, the Kestrel Land Trust (Connecticut River Valley) and the East Quabbin Land Trust (centered in Hardwick) became instrumental partners with the program. The Essex County Ornithological Club and the Ware River Nature Club have worked to get boxes deployed and monitored in their respective regions. Recently, the Berkshire Bird Observatory (Green Berkshires, Inc.) has played an important role in deploying nest boxes in the Berkshires. We also have worked with many individual landowners to get boxes deployed where appropriate.

These efforts proved fruitful, and new boxes began to attract nesting kestrels, sometimes in the first season following deployment. With this success, we worked to deploy additional boxes each year. The kestrel box occupancy and nesting success

rates fluctuated annually, but the percentage of boxes used for nesting has hovered around 30%, and used boxes have averaged around an 80% success rate for producing fledglings in a given year. The nest box program was clearly benefitting kestrel

nesting productivity, and anecdotal reports started coming in that people were noticing more kestrels around the state. Furthermore, in a recent Status and Trends analysis by the Cornell Lab of Ornithology, eBird data since 2007 revealed that Massachusetts and much of New England were showing a surprising increase in kestrel numbers while strong declines were evident in nearly all the

rest of North America. Although this was encouraging news, we wanted a more complete understanding of their population by generating information on their movement and survival patterns. We began ramping up banding efforts in hopes of filling this data gap.

According to the North American Breeding Bird Survey, kestrels have experienced over a 50% decline in population across their range since 1966, and, if current trends continue, the species will lose another 50% of its population by 2075.



This automated radio telemetry station, located at Mass Audubon's Wachusett Meadow Wildlife Sanctuary, is part of the Motus Wildlife Tracking Network.

As part of box monitoring operations, numerous kestrel chicks get banded each year, which is done by MassWildlife and other federally licensed bird banders. To help with resighting efforts of these birds, many were banded with both a federal silver band and a field-readable color-coded

band, like the bands used for bald eagles and peregrine falcons. Although a great deal of information has been gained on movement and survival of eagles and falcons through high-quality photographs, kestrel color bands are much smaller and band codes were seldom reported to MassWildlife or the federal Bird Banding Lab. Still, some interesting data was obtained through these banding efforts, including records in Florida, North Carolina, Virginia, Washington D.C., Maryland, New Jersey, Connecticut, Massachusetts, New Hampshire, and Maine. Some encounters were the result of birds being captured by bird banders, but, unfortunately, many were from dead birds found after being struck by cars or planes at airfields. These data provided a glimpse into the migratory pathways and wintering areas of kestrels, but there were clear biases in the already sparse data, which limited any inference to the overall Massachusetts nesting population. To obtain data more efficiently and effectively on their annual movements and survival, we looked to technological advances and decided to utilize a new network of automated radio telemetry stations, called Motus, to track kestrels.

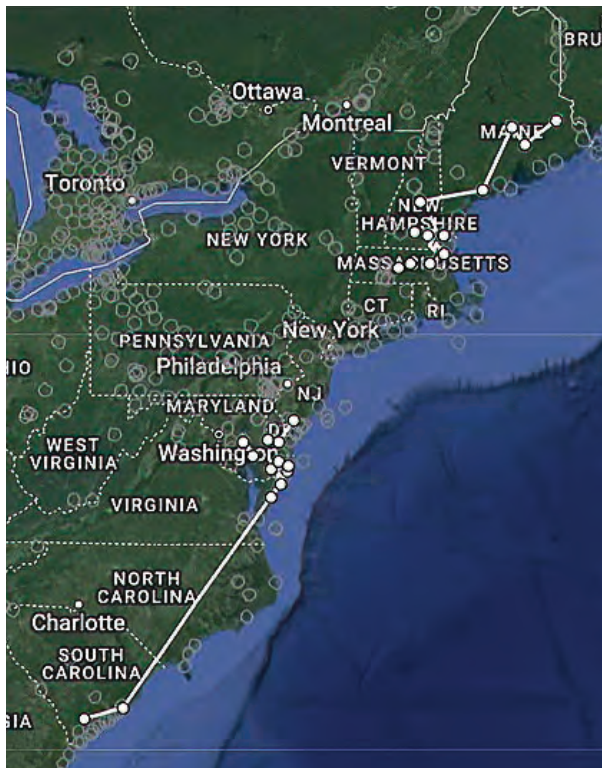
The Motus Wildlife Tracking Network (www.motus.org) is a collaborative effort using automated radio telemetry to track migratory animals (e.g., birds, bats, and insects) and provide valuable information on their movement and survival to promote conservation efforts. Motus

receiving stations can be found around the world, but their densities on the landscape are highest in eastern North America. As part of a multi-state Competitive State Wildlife Grant awarded by the U.S. Fish and Wildlife Service (New Hampshire was the lead state and Massachusetts a partner state on the grant), New Hampshire Audubon coordinated an effort to deploy 50 Motus stations across New England, with 10 in Massachusetts forming a "fence line" running east-west and bisecting the state. Each station consisted of a mast supporting 8 antennas (4 antennas pointed in different directions for 2 different radio frequencies used for wildlife studies), a receiver, and a power source. Being powered by either an electrical outlet (when possible) or a battery and solar panel setup (for remote locations), stations log any detected radio transmitters 24 hours a day throughout the year. Overall, five parallel lines of stations were deployed in New England to detect migratory animals as they moved through the region. Recognizing that this was an ideal technology to collect information on annual movement and survival of kestrels, funding was provided as part of the grant to purchase and deploy Motus tags on kestrels in Massachusetts.

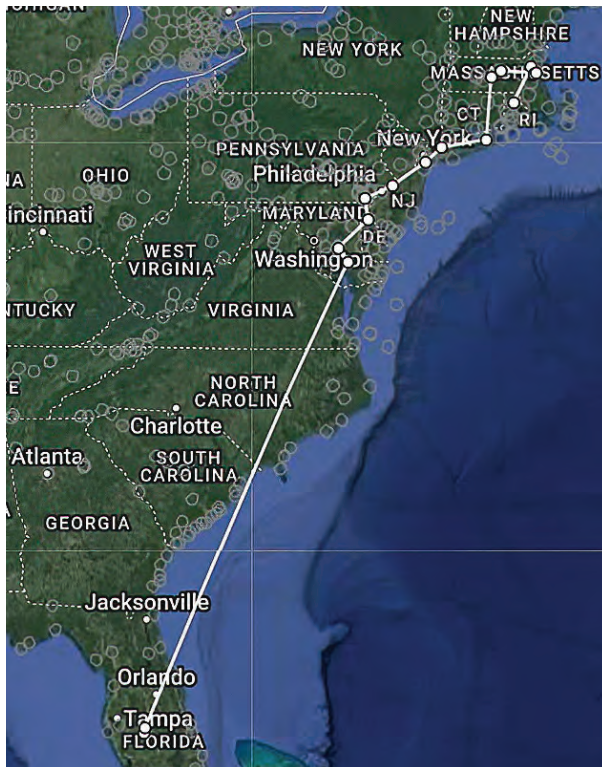
Once the majority of the 50 receiving stations were established throughout New England, MassWildlife and Mass Audubon initiated efforts to deploy tracking devices on kestrels. This began in the summer of 2022, when 14 kestrels were captured and fitted with radio transmitters. We used a hybrid transmitter, powered by both a small battery and a solar panel, that weighs approximately 2.5 grams. A backpack-style harness that goes over the shoulders and under the wings was used to attach the device to the bird. Once attached, the transmitter lies flat on the bird's upper back with an antenna that drops down along the tail. Transmitters were programmed to emit a uniquely coded radio signal every 5 seconds, and tags were designed to function for over a year. Once a bird and transmitter are within approximately 15 kilometers of a



A female American kestrel wearing a Motus tracking transmitter.



Detections of an adult female kestrel tagged in 2022 in central Massachusetts. After a nesting failure in mid-summer, the bird moved northeast and was thought to enter Canada on July 1. The bird was next detected in October on its southbound migration and was last detected in South Carolina a few days later. In total, this bird was detected by 24 Motus stations over 7 days. Empty circles represent Motus stations and closed (white) circles represent stations where the bird was detected.



This kestrel was captured and tagged in late June in an urban area just outside Boston. After successfully fledging young from its nesting box, it spent time in central Massachusetts before initiating migration in mid-September. It moved south quickly and a week later was detected in central Florida. This bird was detected by 16 Motus stations over 29 days.



Photo by Troy Gippis/MassWildlife

station, they can be detected and logged by the station. However, signals may travel farther under ideal conditions, as when birds are flying at high altitudes or over water where there is little interference with signal transmission. To facilitate data transfer, many stations, including all the New England stations deployed under this project, have the capacity to send data over the cellular network, allowing for results to essentially be observed in real time. Perhaps even more interesting, anyone with an internet connection can review the basic results on the Motus website (Go to “tag deployments” under Project American Kestrel Massachusetts, project #521).

We were not sure what to expect in terms of outcomes when the project began, but results have already exceeded expectations. Of the 14 kestrels tagged in the project’s first year, we were able to determine that all birds survived the nesting season and initiated fall migration. One of the birds has been detected by a station on 196 days while another has been detected at 49 different stations (the current highs for the number of detections by days and stations). Interestingly, following a failed nesting attempt in mid-summer, one kestrel quickly moved north and over a 3-day period was picked up by 11 receiving stations as it flew from its central Massachusetts nesting territory to north-eastern Massachusetts, north to the White Mountains in New Hampshire, where it redirected east through much of Maine before detections ceased as it approached the Canadian border. Although there are many Motus stations in eastern Canada, none of these detect the frequency of our tags (434 MHz), and we suspect this bird continued east into Canada on July 1. The next time this bird was detected was in southern New Jersey on October 5, and its last detection was on October 10 in coastal South Carolina.

In general, once leaving Massachusetts, we found that kestrels moved south along the coast to the mid-Atlantic. At that point, some continued the trajectory of

flying south along the coast while others went undetected and likely moved inland, where few stations exist. Although no birds were detected during the winter months, nearly half of tagged birds (43%) were picked up on spring migration, and these birds returned to their nesting areas in Massachusetts during the last two weeks of March. During the summer of 2023, an additional 21 adult kestrels (from Northampton to Carver) were captured and fit with transmitters, and the early results are similar to patterns documented in the first year of the project. Again, most southern movements were in the vicinity of the coast, and the initiation of fall migration was variable, with some birds moving south in late July while others remained near their breeding territory into autumn. We eagerly anticipate more data as they come in through the Motus network.

Through the nest box monitoring and tracking programs, we are starting to piece together information on the nesting success, movement, and survival of kestrels that breed in the Commonwealth. However, there remains a lot to learn about what is causing the mysterious decline of this species. We plan to continue tracking and monitoring efforts to improve our understanding of the annual conservation needs of the American kestrel. Additionally, seeing the success of our project, other states in the Northeast have shown interest in similar tracking projects with kestrels and combining data over a broader region should be particularly informative. Using this information, we will be able to better manage for this species here in Massachusetts and inform conservation efforts throughout the Atlantic coast.

Organizations and individuals interested in establishing an American kestrel nest box project are encouraged to contact MassWildlife at mass.wildlife@mass.gov or call (508) 389-6300.

About the Author

Andrew Vitz, Ph.D., has been the State Ornithologist for MassWildlife since 2012.



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Our native ladies'-tresses orchids are a joy to find from August through October. These delicate flowers are arranged around their stem in a single spiral, a double spiral, or sometimes in quadruple spirals. It was determined recently that what was thought of as a single, widespread species (*S. cernua*, or nodding ladies'-tresses) is several species with more specific biogeography. The hint of buttery yellow on this plant's lowest petal (labellum), the angle and width of the side petals (lateral sepals), how tightly the floral bracts surround the flowers, and whether the bracts are green throughout or whitened on their edges, all give clues that this species is a yellow nodding ladies'-tresses (*Spiranthes ochroleuca*). Ladies'-tresses often have an enticing yet delicate floral scent that is worth sampling when you discover them. Photo by Troy Gipps/MassWildlife



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