Farmland Raptor Project

2020 Newsletter

HAWK MOUNTAIN

Twenty-twenty was a year of fast paced upheaval on most fronts, but through it all people found solace in birding, and as a result farmland raptor sightings grew and benefitted from birders' increased focus on their home grasslands. While direct reporting using the Project, interface dropped off of eBird continues to be an invaluable resource for capturing citizen scientist field efforts. As you will see, Hawk Mountain's efforts in studying American kestrels has grown significantly and with collaborator support covers a significant region of the eastern flyway. We collaborated on management goals for larger grasslands within the state that will hopefully benefit our farmland raptors for years to come. The team has been awarded a grant from the Kittatinny Coalition that will allow us to begin to analyze the data we have been collecting and determining ways for distributing our findings to benefit landowners and raptor enthusiasts throughout the state. We are especially thankful for our following and as always look forward to communicating with you outside the yearly newsletter below, so don't hesitate to reach out if you have any questions or sightings to share. Here's to the upcoming year full of raptors surfing the grasslands in search of their next meal!

~Bracken Brown Farmland Raptor Project Coordinator

How You Can Help

• **Become a Donor or Sponsor:** Funds from donors and sponsors are used to build nest boxes, attend public events, print brochures and posters, and expand our network by reaching out to new audiences. These are expenses we must cover each year, and your donations are crucial to our efforts.

•**To make a donation:** Use our secure web form, and note in comments for Farmland Raptor Project: https://www.hawkmountain.org/general-donations~default.aspx
OR: Contact Bracken Brown at brackenbrown@hawkmountain.org or 570-943-3411 x103.

• **Report Sightings:** Use the Online Sighting Form at www.hawkmountain.org/farmlandraptors

• **Build and Erect Nest Boxes:** For barn owls and American kestrels, see plans on our web site.

• **Join Us at Public Events:** Email farmlandraptors@gmail.com to volunteer

• **Maintain large grasslands on your property:** Nesting sites for short-eared owls and northern harriers

Pa Farmland Raptor Project
www.hawkmountain.org

New Partnership.

The Farmland Raptor Project has been awarded a year-long grant from the Kittatinny Coalition to identify important grassland raptor areas within the 12 counties associated with the Kittatinny Ridge. This exciting opportunity aims to identify sites that are supporting grassland raptors along the Ridge to ensure grassland raptors continue to find healthy habitat within the state. This grant will allow us to update information pamphlets on farmland raptors in the Kittatinny region, to establish the best methods for utilizing the FRP database to identify and classify crucial habitat, to place additional nestboxes within the Kittatinny corridor, and most importantly, to educate the farmland communities along the Kittatinny. This work will continue to highlight the importance of community-driven conservation to benefit these iconic species.

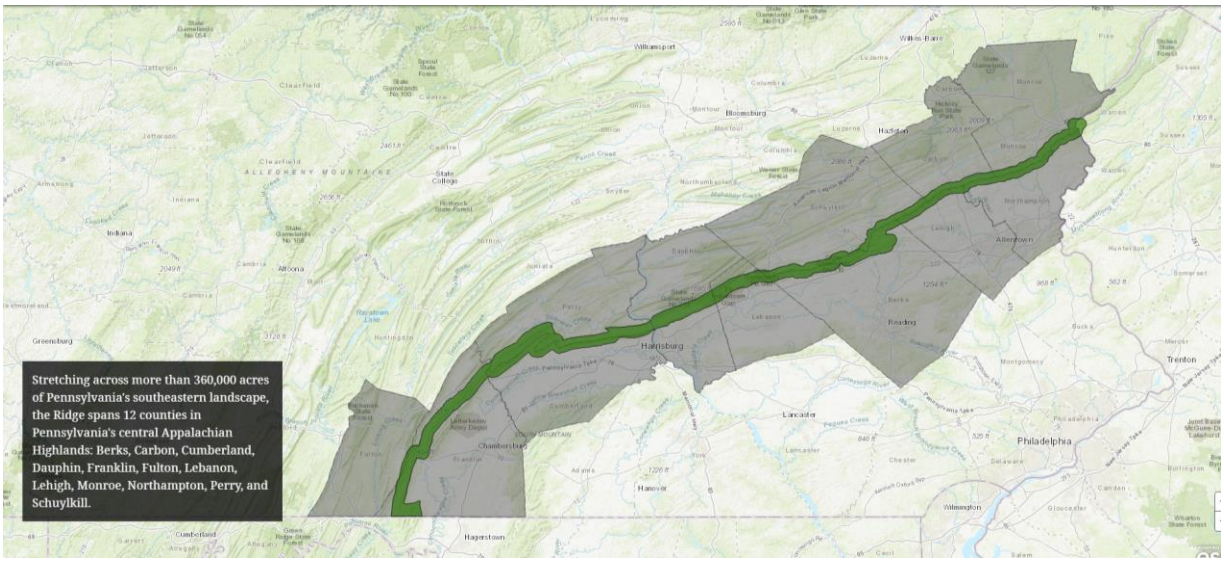


Figure 1: ***The Kittatinny Ridge corridor through Pennsylvania. The counties associated with the ridge provide an excellent subset of the state to develop the best means for analyzing the farmland raptor database. Once established these methods can be used to assess other regions of the state. www.kittatinnyridge.org***

2020 SIGHTINGS

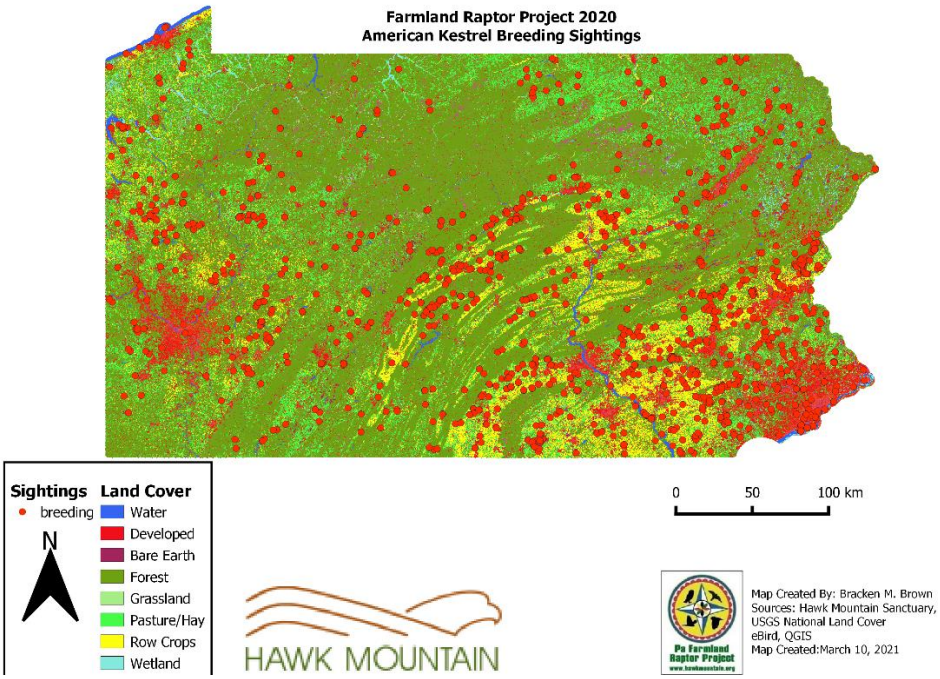
In 2020 we noted a continued increase in reported sightings on both the farmland raptor platform as well as in the birding software, eBird, which allows people to submit accurate location specific sightings from the comfort of their cell phone or computer. Worth noting was a significant increase in northern harrier detections during the breeding season, as well as for short-eared owl during the winter months. As always, the barn owl continues to be the least reported of our farmland raptors. Once we download all the sighting location data it is vetted to remove replicated data, then the records are used to generate the statewide distribution maps, see specie account below.

Table 1: FRP 2020 Raptor Sighting Sources

	Farmland Raptor	**eBird**
American Kestrel	279	13,098
Northern Harrier	56	4,452
Barn Owl	0	72
Short-eared Owl	8	432

American Kestrel: *Falco sparverius*

Of the American kestrel resightings, 2,977 occurred during the breeding season and 10,400 during the non-breeding period. The number of encounters increased from previous years by 25%. As you can see in the maps, kestrels prioritize open grassland and agricultural habitat throughout the state. Their smaller territory requirements allow them to take advantage of a larger region of the state than their larger counterparts.



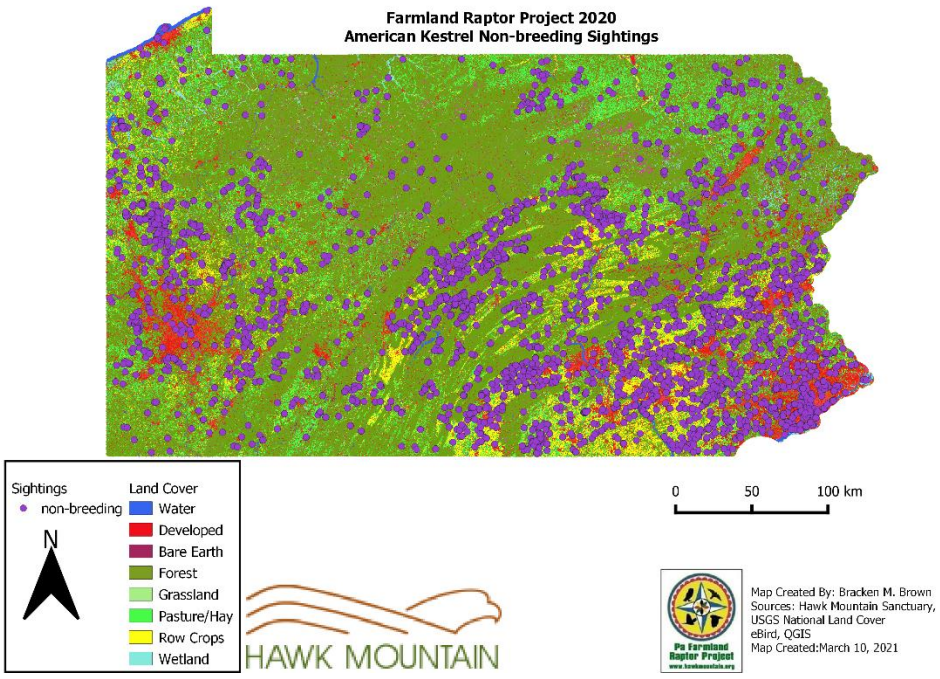
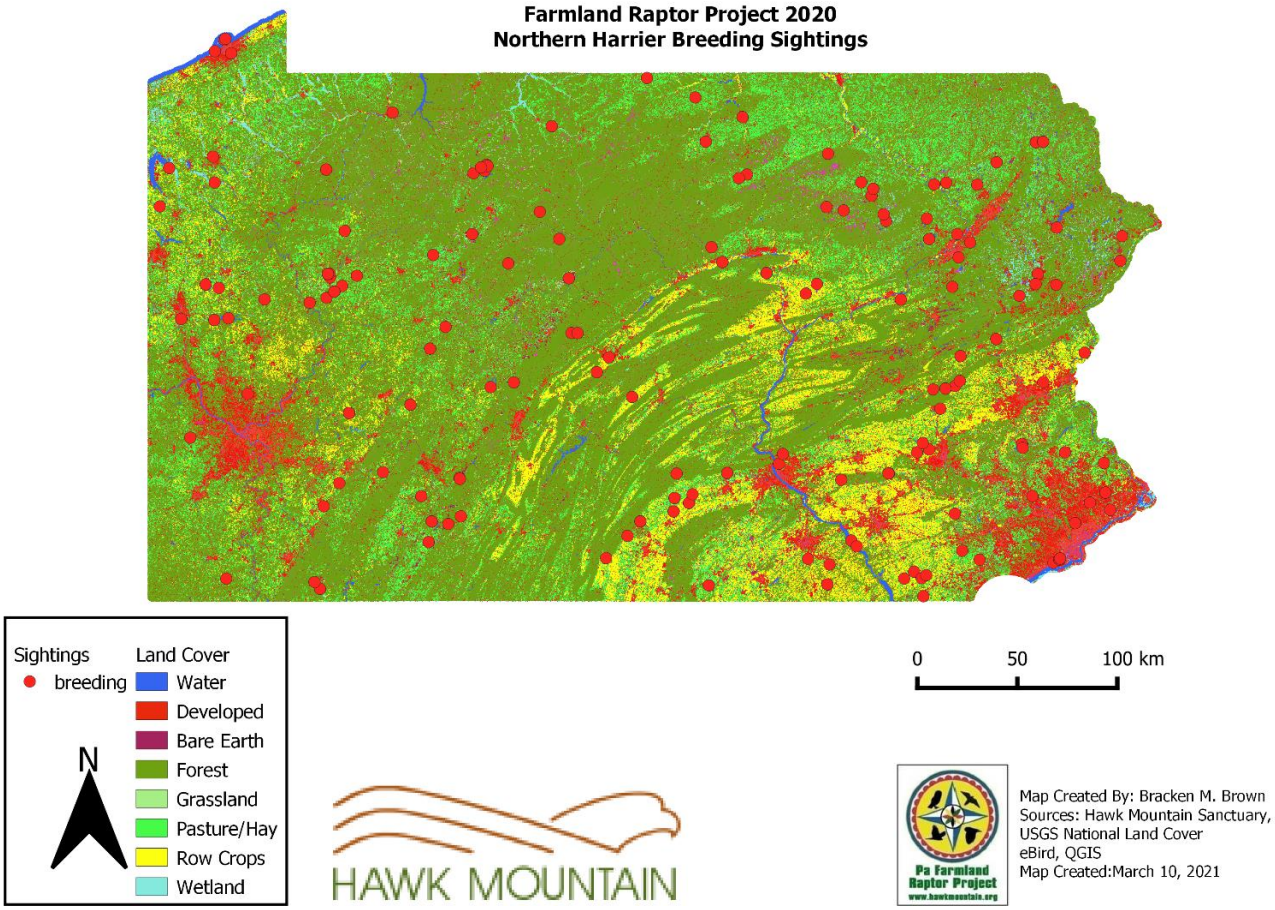
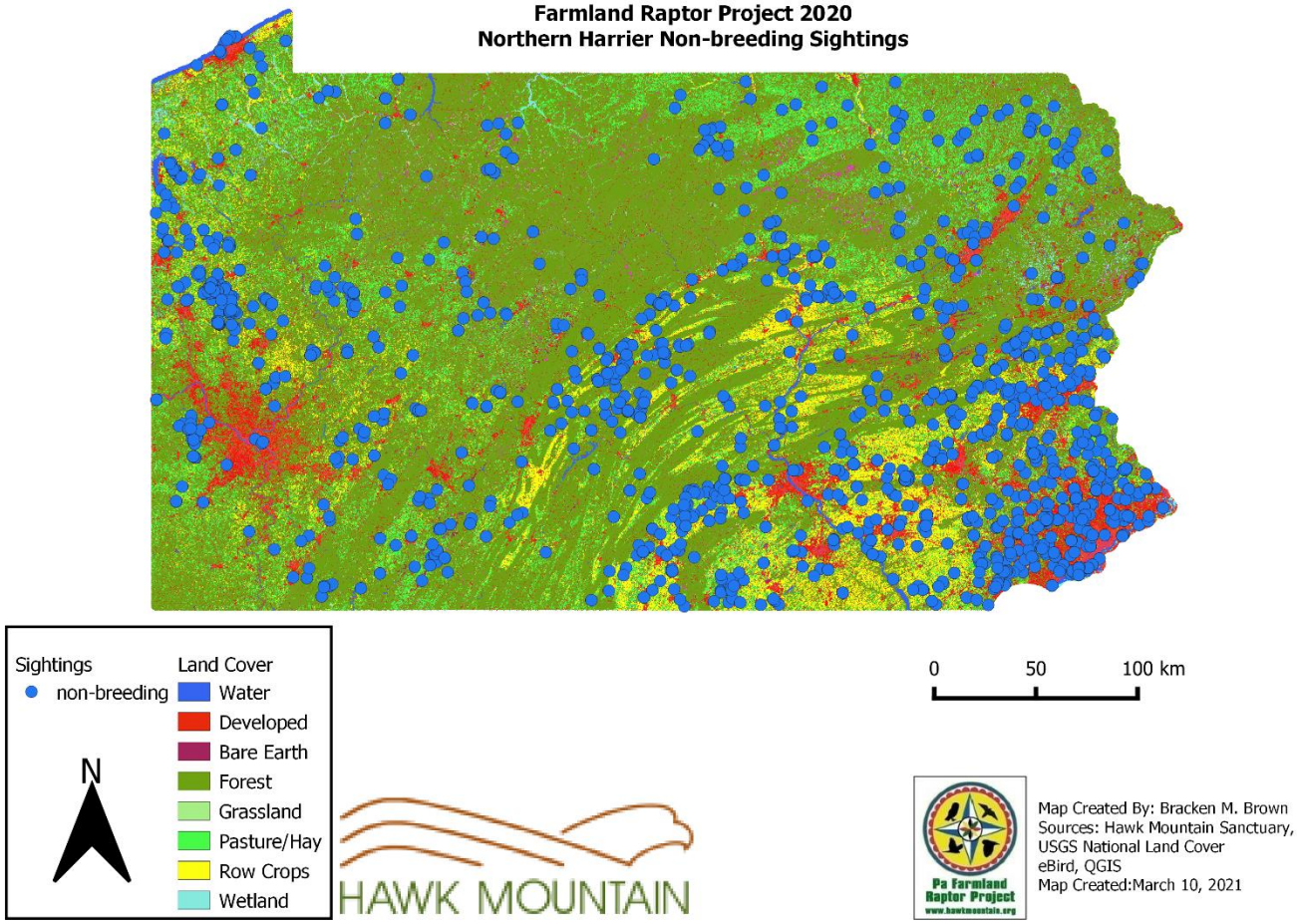


Photo of adult male Northern Harrier by Traci Sepkovic.

Northern Harrier: *Circus cyaneus*

Interestingly, last year 223 northern harrier sightings occurred during the breeding season, and although none of the reports were associated with confirmed breeding events, it does raise hope that there are more harriers actively nesting within the state of Pennsylvania than are known. Harriers rely on large undisturbed tracts of grassland to raise offspring and as such their summer habitats are much more restricted than for wintering birds moving through the state. Farmland Raptors would appreciate leads on any suspected northern harrier nests; see below in ***Find That Breeding Grassland Raptor*** on page 12.





Northern Harrier over warm season grass meadow. Photo credit David Brandes

Short-eared owl foraging. Photo credit Traci Sepkovic

Short-eared Owl: *Asio otus*

Short-eared owls remained elusive in 2020 across the state with 434 short-eared owl reports from 52 locations. These reports all came during the winter. With the need for extensive grasslands to successfully breed, short-eared owls are an infrequent nester within PA, if you observe breeding please check out Find ***that Breeding Grassland Raptor*** on page 12.

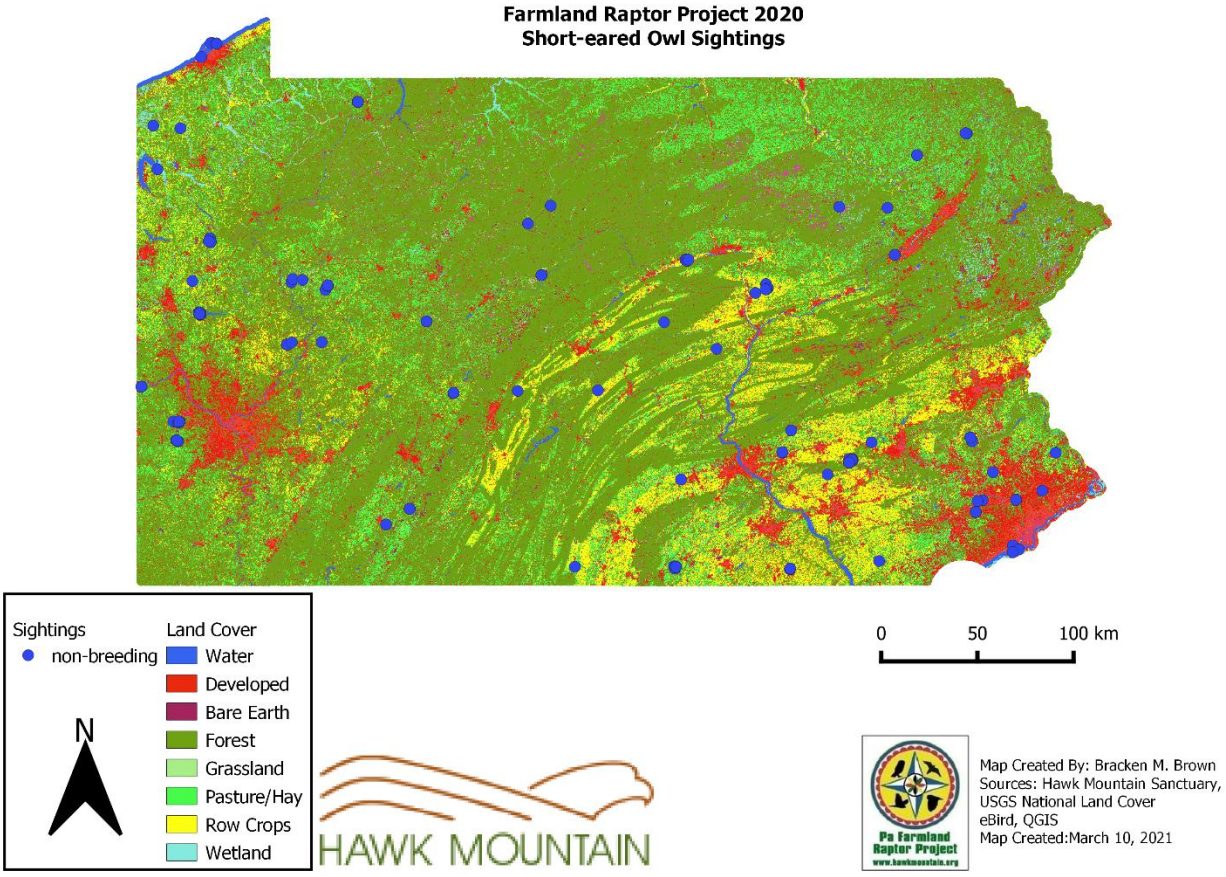
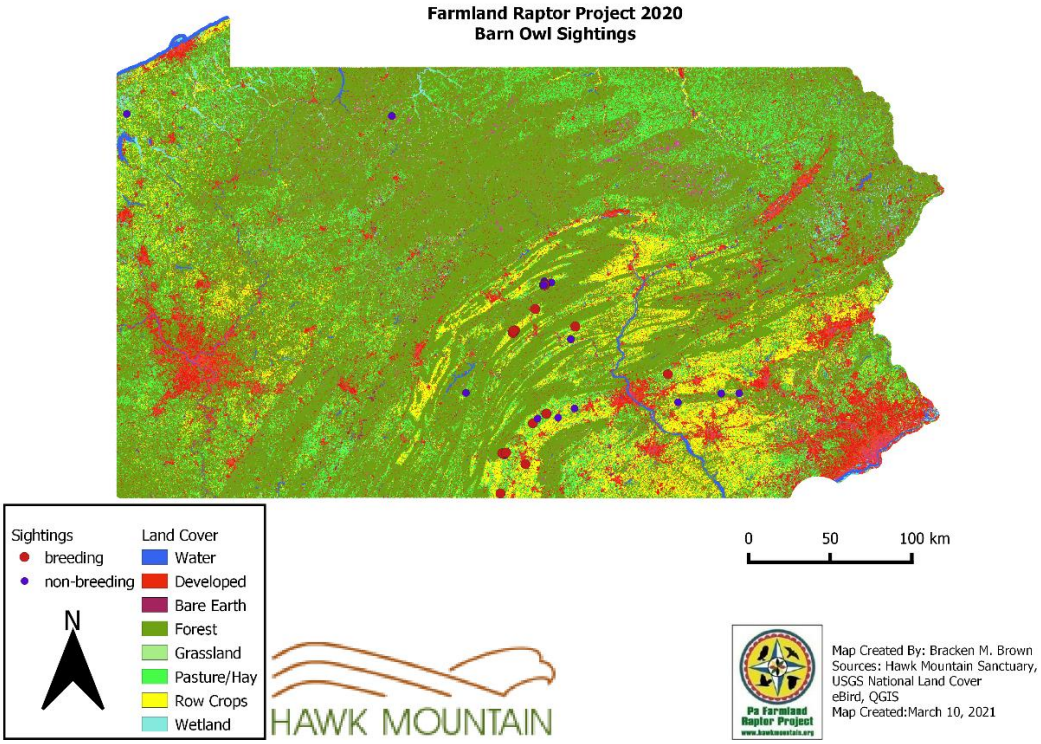


Photo of near-fledging barn owls by Traci Sepkovic.

Barn Owl: *Tyto alba*

Barn owls remain our least reported grassland species. Sporadic reports originating around larger tracts of open agriculture often hosted barn owls throughout the year, with a few sporadic sightings often associated with dispersal from the nest. This nest box user benefits from an active box monitoring program coordinated by Dan Mummert of the PA Game Commission, who provided the following report.

In 2020, the PA Game Commission's wildlife diversity biologists confirmed nesting barn owls at 46 sites throughout the state. Nine of these confirmed nests were at newly discovered locations including a successful nest in Crawford County which is the first confirmed barn owl nest in northwestern PA for at least a couple decades. In addition, the biologists banded 153 nestlings at 35 of these successful nests. One of these barn owl nests, which was in Lancaster County, had an exceptionally late second clutch with nestlings being banded during Christmas week. These nestlings were about six weeks old at the time of banding and would have fledged to a wintery landscape in early January. Similar to our own experiences during this pandemic year, we hope these young barn owls can successfully navigate this difficult winter and find better days ahead.



Hawk Mountain Kestrel Nest Boxes: Slightly better occupancy but high failure rate

By: Dr. Jean-Francois Therrien Senior Scientist and Graduate Studies Director

Occupancy rose a bit this past summer compared to the last two as 36% of the 118 checked nest boxes housed kestrels, totaling 43 breeding pairs (Table 1).

The total number of young kestrels that fledged from our nest boxes in 2020 also reflected the increase in occupancy rate. A total of 25 successful breeding pairs produced 96 fledglings, with an average of 3.8 fledglings per pair (all higher values than last year), but still below the historical average. Fledgling sex was very unequal this season with 60% males and only 39% females, which could suggest an overall lower prey availability as females are more energetically costly to raise due to their larger body mass. This year's average laying date was April 27th, which is a bit earlier compared to historical values (Table 2). The first clutch was initiated on April 12th and the last on May 29th.

Table 1. Average numbers of pairs, occupancy, clutch size, and proportion of failures by American kestrels in Hawk Mountain Sanctuary nest boxes

Year	Number of pairs	Occupancy	Clutch size	Nest failure
1992-2001	90	46%	4.6	29%
2002-2011	54	40%	4.5	25%
2012	52	44%	4.7	27%
2013	47	39%	4.8	15%
2014	42	34%	4.6	24%
2015	45	35%	4.6	18%
2016	50	38%	4.7	24%
2017	47	35%	4.4	32%
2018	34	29%	4.6	21%
2019	35	29%	4.4	28%
2020	**43**	**36%**	**3.7**	**40%**

While the occupancy rate increased this year, so has the associated failure rate which hit a decade-level high. Usually when the occupancy rate is high, so is the failure rate, but this year's failure rate surpassed all others regardless of occupancy rate that year. While we must focus on long-term trends instead of a single year's data, it is clear that kestrel populations need us now more than ever. If kestrels continue to have these seasons of low reproductive success, population sizes will undoubtedly be affected. Since we have seen continent-wide declines over the last twenty years, we need to invest resources into investigating these trends to learn more about how we can help.

Table 2. Average laying dates for American kestrels using Hawk Mountain Sanctuary nest boxes (sample size represents numbers of pairs for which laying date is known)

Year	Sample size	Average laying date
1992-2001	648	1 May
2002-2011	347	2 May
2012	35	25 April
2013	39	2 May
2014	34	7 May
2015	29	1 May
2016	39	1 May
2017	28	27 April
2018	18	3 May
2019	23	2 May
2020	**25**	**27 April**

Of the boxes used by non-target species, 32 boxes were used by European starlings, 7 by gray squirrels, and 1 was inhabited by wasps. These results once more highlight the strong competition that exists for nesting cavities and the importance of providing such an essential resource for this declining population.

New graduate student joins the team

Mercy Melo, an undergraduate student at Cedar Crest College, Allentown, has a long history of working with Hawk Mountain Sanctuary's kestrel nest box monitoring program. Starting in the summer of 2018, she has been researching morphological, physiological, and microbiome development of kestrel chicks, and more recently, has been looking into how chicks behave after leaving the nest box.

New graduate student, Mercy, tracking winter kestrel movement

Flying Forward by Mercy Melo.

Hawk Mountain is now leading a multi-state collaborative project to gain a deeper understanding of the American kestrel population decline. Funded in part by PA Game Commission, the PA Wild Resource Conservation Program of DCNR, and private foundation gifts, our project aims to investigate the effects of habitat change, environmental contaminants, decreased prey abundance, and competition on both the individual and population levels. Our goal is a multifaceted approach to understand the decline and hopefully reverse current population trends.

Habitat Change

American kestrels thrive in open habitats with a few perching spots such as agricultural fields with nearby forested land. With both types of land being converted more and more into residential properties, it is suspected that the ongoing changes in this habitat may be a major factor in kestrel population declines. In the upcoming project, we will investigate how different habitat types, such as agricultural fields and open meadows, may affect the quality of kestrel chicks and ultimately determine their survival. Using radio telemetry and color bands, we also plan on following kestrel chicks after they leave the nest to determine how they use their habitat to evade predators and learn to hunt.

Environmental Contaminants

The American kestrel diet, which mostly consists of small mammals, insects, and invasive songbird species, makes them a great addition to any farm, but also leaves them vulnerable to a new source of challenges: agricultural pesticides. Pesticides in use today, including neonicotinoids, have been shown to alter reproductive and foraging behaviors of many different grassland bird species, and kestrels are no exception. Rodenticides can have lethal results for raptors as well. To explore the effects of contaminant load in kestrels, we will measure contaminant load in both adults and chicks and correlate those values with measures of reproductive success and survival, respectively.

Decreased Prey Abundance

When insecticides and rodenticides are employed to control those populations, kestrels face a stark decrease in available

prey options. With less prey available, adult survival and ability to feed chicks is suspected to be affected. By quantifying prey populations around nest-boxes and correlating that data with chick quality, we hope to see how these effects ultimately impact the next generation of breeding kestrels.

Increased Competition

When resources like suitable habitat and prey availability are limited, other species with a similar niche are likely to compete for those critical necessities. The raptor guild is no exception as many species, such as red-tailed hawks and Northern Harriers, prefer open landscapes and have similar diets. This competition for territory and prey can only intensify the challenges already created by limited resources for all species involved in the interaction. Outside of the raptor guild, kestrels also receive competition pressure from other cavity-nesting species such as European starlings. To understand how competition may be involved in the kestrel decline, we plan on investigating how proximity to, and interactions with, these competitors correlate to reproductive success and fledgling survival.

Female kestrel with meadow vole prey.

Bill Shupp 2021.

Conclusion

American kestrels face many challenges that may ultimately be leading to their population decline. By investigating the effects of these different challenges, Hawk Mountain hopes to gain insight into future conservation management strategies for kestrels and other raptor species that are undoubtedly facing similar challenges. To help with this effort, citizen scientists across the Northeastern United States can report sightings of kestrels with color bands or transmitters to our project at hawk.mountain.kestrel@gmail.com, or simply email us with any questions regarding the project or kestrel conservation in general. By working together with other nest-box programs and citizen scientists, Hawk Mountain's research team is looking forward to learning more about how we can help this beautiful raptor species return to its abundant status.

Short-eared owl in winter, David Brandes

Find that Breeding Grassland Raptor

Although raptors that utilize nest boxes allow us to garner more information on their breeding status throughout the state, what can we do to identify and understand key breeding sites for non-box using species? This is a current predicament for the FRP group, and we rely heavily on citizen scientists to allow us to monitor the state of Pennsylvania. With their state threatened and endangered status and general population declines throughout the region, northern harrier and short-eared owl data is imperative to locating and protecting critical nesting habitat. Both species nest on the ground in open grasslands, making surveying for a nest challenging. However, presence in the appropriate habitat during the breeding season is often an excellent indicator of breeding being attempted. While the birds do not read their information manual the below safe dates and nesting seasons do provide a good general guideline for when you can consider a sighting noteworthy. Because last year there were no nesting short-eared owls detected in Pennsylvania, it is helpful for birders to check large grasslands in northern counties in summer 2020.

It is important to never harass a ground-nesting species by repeated visits to confirm breeding, as you could cause nest failure. However, if you do notice a bird present within the safe dates listed below, or displaying breeding behavior, you may carefully recheck the region from afar later in the breeding cycle to confirm the bird's continued presence and report that valuable information. Due to the sensitive nature of these species breeding data, all nest observations are kept strictly confidential at Hawk Mountain to guarantee no increased foot traffic disturb any nesting bird. If you are fortunate enough to encounter adults attending fledglings, enjoy the experience and include in your report how many young were visible during the encounter. Fledglings might be observed later in nesting season… GIVE DATES?

Common Name	Scientific Name	State Listed	Safe dates	Nesting Season
Northern Harrier	*Circus cyaneus*	THREATENED	June 1 – July 31	April 15 - August 31
Short-eared Owl	*Asio flammeus*	ENDANGERED	April 20 – August 15	April 15 - July 31

If you do encounter breeding northern harrier or short-eared owl, please forward information on your encounter to Bracken Brown at Hawk Mountain Sanctuary brackenbrown@hawkmountain.org or 570-943-3411 ext. 103.

HAWK MOUNTAIN

Thank you for reading our 2020 newsletter. This is one of Hawk Mountain's initiatives to promote and facilitate farmland raptor conservation practices. It is only possible to achieve this effort through support of landowners and members of the public reporting their sightings and supplementing land practices to benefit these iconic raptors that rely on our grass and farmlands to survive. If you have any questions about how to get involved or want to share your farmland raptor, please don't hesitate to get in touch via one of the methods listed below. Here is to a great 2021 nesting season for farmland raptors and those who monitor them! A particular thank you goes out to the photographers willing to share their phenomenal pieces for the newsletter. This year contributions came from Traci Sepkovic, David Brandes, and Bill Shupp

Contact us or for more information

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or find out more at our website: www.hawkmountain.org/conservation-science/active-research/raptor-conservation-studies/farmland-raptors

570-943-3411 ext. 103

410 Summer Valley Road,

Orwigsburg, PA, 17961

To report your farmland raptor sightings:

https://www.hawkmountain.org/conservation-science/active-research/raptor-conservation-studies/farmland-raptors