2019 was a year of focus for the project! Working under limited resources we sought to highlight outreach opportunities that netted the project the most exposure to groups equipped to implement grassland raptor conservation. Highlighted was our work in classrooms connecting students with conservation needs of farmland raptors and incorporating American kestrel nest box curriculum in FFA and science programs near the Sanctuary. We continued to give talks to interested groups and visited conferences that connected us with property owners, and we hope to continue to provide information to assist these iconic species maintain a hallux hold in Pennsylvania. All of this wouldn’t be possible without YOU the citizen scientist assisting with this effort! Thank you for your continued support.

~The Farmland Raptor Team

New for Farmland Raptor Project

Hello readers, I would like to introduce myself, I am Bracken Brown Biologist-Naturalist at Hawk Mountain Sanctuary. As of 2019 I am the primary coordinator for this fantastic project! Growing up on a farm in the Kempton valley, farmland raptors have been a constant fascination of mine since joining Bob and Sue Robertson to band kestrel nestlings at age 6.

As the picture attests, I can still be found pursuing my passion for raptors in the region, and I look forward to getting to participate in all aspects of this fantastic project and getting to hear about your farmland raptor encounters!
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](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](http://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

**SIGHTINGS**

In 2019 we received 254 reports from 57 individuals directly to the Farmland Raptors website and an additional 12,618 reports via the eBird portal, representing a stable resighting and reporting effort similar to prior years. Our diurnal raptors were encountered the most, while the owls were detected significantly less; see Table 1 for number of sightings for each species. The records are used to generate the statewide distribution maps.

<table>
<thead>
<tr>
<th>Table 1: FRP 2019 Raptor Sighting Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farmland Raptor</strong></td>
</tr>
<tr>
<td>American Kestrel</td>
</tr>
<tr>
<td>Northern Harrier</td>
</tr>
<tr>
<td>Barn Owl</td>
</tr>
<tr>
<td>Short-eared Owl</td>
</tr>
</tbody>
</table>

Kestrel with vole: Bill Moses
American Kestrel: *Falco sparverius*

Of the American kestrel resightings, 1,829 occurred during the breeding season and 3,353 during the winter. The number of encounters increased from previous years by 63%. As you can see in the maps regardless of the season kestrel tended to utilize similar regions throughout the state, with the southeastern region and the valley portion, of the ridge and valley region, having the highest number of sightings. See maps below.
Northern Harrier: *Circus cyaneus*

Interestingly last year 103 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 known. Farmland Raptors would appreciate leads on any suspected northern harrier nests; see below in *Find That Breeding Grassland Raptor* on page 9.
**Short-eared Owl: *Asio otus***

Short-eared owls remained elusive in 2019 across the state with only 273 short-eared owl reports from 35 locations. These reports all came during the winter, though due to their reclusiveness they could be breeding within the state without being detected. Please check out **Find that Breeding Grassland Raptor** on page 9.
Barn Owl: *Tyto alba*

Barn owl had the fewest reports from across the state, only 42 in 2019. Several sites showed both summer and winter use by the owls, while most sites only reported them during the breeding season. 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 2019, the PA Game Commission wildlife diversity biologists were able to confirm only 29 active barn owl nest sites throughout the state. This is the lowest number of known active nest sites since the PGC’s Barn Owl Conservation Initiative began in 2005. In addition, 66 barn owls were banded at 17 different nest sites which is also an especially low number compared to previous years. A fairly steady downward trend in barn owls has been observed over the past several years with 2013 being a high water mark with 75 active nest sites confirmed in the state and 195 nestling barn owls banded. We’re hoping to learn more about the reason for decline by investigating if disease such as West Nile Virus or toxins such as rodenticides are having a significant affect on the population.

Figure 1: Barn owl nest sites, 2005-2019. Open black rings indicate a nest that was last confirmed active between 2005 and 2018 (n = 207). Solid black circles indicate a nest that was confirmed active in 2019 which was also active in previous years (n = 24). Nests newly discovered in 2019 are identified as red ringed circles (n = 5).
Another low year for breeding American Kestrels at Hawk Mountain

By Jean-François Therrien, Senior Scientist

For a second year in a row, 29% of our 120 nest boxes were occupied this past summer, totaling 35 kestrel pairs. Just like last year, these numbers represent another very low occupancy rate (one of the lowest ever recorded within our nest box program since the onset of precise monitoring in 1992, Table 1).

The total number of young kestrels that fledged from our nest boxes in 2019 also accounted for the lowest number ever recorded at Hawk Mountain. Indeed, only 22 pairs successfully fledged 80 young, with an average of 3.6 fledglings per successful breeding pair. Forty-nine percent of the nestlings were male, and 51% were female. This year’s average laying date was May 2, which is the exact historical average date. The first clutch was initiated on April 18 and the last on June 10.

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of pairs</th>
<th>Occupancy</th>
<th>Clutch size</th>
<th>Nest failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-2001</td>
<td>90</td>
<td>46%</td>
<td>4.6</td>
<td>29%</td>
</tr>
<tr>
<td>2002-2011</td>
<td>54</td>
<td>40%</td>
<td>4.5</td>
<td>25%</td>
</tr>
<tr>
<td>2012</td>
<td>52</td>
<td>44%</td>
<td>4.7</td>
<td>27%</td>
</tr>
<tr>
<td>2013</td>
<td>47</td>
<td>39%</td>
<td>4.8</td>
<td>15%</td>
</tr>
<tr>
<td>2014</td>
<td>42</td>
<td>34%</td>
<td>4.6</td>
<td>24%</td>
</tr>
<tr>
<td>2015</td>
<td>45</td>
<td>35%</td>
<td>4.6</td>
<td>18%</td>
</tr>
<tr>
<td>2016</td>
<td>50</td>
<td>38%</td>
<td>4.7</td>
<td>24%</td>
</tr>
<tr>
<td>2017</td>
<td>47</td>
<td>35%</td>
<td>4.4</td>
<td>32%</td>
</tr>
<tr>
<td>2018</td>
<td>34</td>
<td>29%</td>
<td>4.6</td>
<td>21%</td>
</tr>
<tr>
<td>2019</td>
<td><strong>35</strong></td>
<td><strong>29%</strong></td>
<td><strong>4.4</strong></td>
<td><strong>28%</strong></td>
</tr>
</tbody>
</table>

Even more concerning is the associated failure rate, which was relatively high this year. Usually when the occupancy rate is low, as seen in previous years, so was the failure rate. But this year we saw a combination of low occupancy and low reproductive success, which is not a good sign for the long-term population trends. We need to remember that a single year cannot be taken as a global picture, and that is why we are engaged in this long-term study. However, if years with such low production are becoming the norm, healthy kestrel populations might become a real concern over the long term. American kestrels have suffered a continental-wide decline over the last twenty years, and we need to put serious attention into this concerning phenomenon. We are thus eager to see if the next breeding season will show encouraging signs. But we also need your support more than ever.
After a record-breaking heat wave in January, Hawk Mountain’s valley was wet and foggy. Last week, Hawk Mountain staff, Bracken Brown, Biologist, and David Barber, Senior Research Biologist, hoped to make use of the morning hours before the rain set in and prompted our local farmland raptors to search for cover. We drove down to the one-lane backroads nestled between quiet farms with charming red and white barns. Bracken pointed out trees that held Hawk Mountain kestrel nestboxes along our route. The ride continued until we could spot an American kestrel disguising herself with a group of starlings. We placed the trap along the side of the road and backed our vehicle away. Almost immediately the female kestrel swooped down to the trap and danced around it, inspecting it closely. She pecked at it, hovered over it for a few seconds, and then flew back to the safety of her powerline. She seemed to mock our efforts a few times by bobbing her tail and calling into the fog. Once she resumed her preening, we knew she couldn’t be fooled.

Hawk Mountain Sanctuary has conducted long-term monitoring research on American kestrels starting with our migration counts in 1934 and stemming into local nestbox monitoring that began in 1959. Data collected over 61 years has allowed us to monitor local kestrel population trends. The kestrel nestbox monitoring program is the longest running of its kind. It fosters Hawk Mountain’s community involvement as our scientists work with local farmers and property owners who have kestrel nestboxes on their properties within the Hawk Mountain viewshed. However, within the past few years we’ve been noticing a downward trend in numbers of kestrel breeding pairs. Hawk migration counts at Hawk Mountain and other eastern sites have shown consistent declines for more than two decades. In response to our observations and thanks to a generous jump-start grant from a family foundation, Hawk Mountain is launching new research to pinpoint the cause for kestrel population declines and save the kestrel. Funds from the grant will allow us to bring in new graduate students and help leverage additional funding for kestrel research and conservation efforts. Before we can look to the future though, we must look at what we’ve learned from our research in the past.

Kestrel research at Hawk Mountain in 2020 will represent our first steps in pinpointing kestrel declines in the east. One of our goals is to better understand survivorship rates over time and throughout the life cycle. We seek to better understand the cause and timing of the mortality to conserve breeding pairs and their nestlings. In order to determine the cause for the decline in fledged kestrels, we must have a better grasp of their developmental processes and survival once they leave the nest. We will be continuing to gather blood samples, feather samples, and unhatched eggs to examine how contaminants, such as neonicotinoids and other agricultural pesticides and herbicides, may be impacting the birds. We will be utilizing radio transmitters and color bands to further monitor survival adults and fledglings. Additionally, we will be looking at land use data to measure the impact of land changes on reproductive success and survival.
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.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>State Listed</th>
<th>Safe dates</th>
<th>Nesting Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Harrier</td>
<td>Circus cyaneus</td>
<td>THREATENED</td>
<td>June 1 – July 31</td>
<td>April 15 - August 31</td>
</tr>
<tr>
<td>Short-eared Owl</td>
<td>Asio flammeus</td>
<td>ENDANGERED</td>
<td>April 20 – August 15</td>
<td>April 15 - July 31</td>
</tr>
</tbody>
</table>

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.
Building Boxes: Become part of a Nest Box Network

What should you do if you have open fields or farmland and want to deploy your own nest box to help a farmland raptor, but want your data to contribute to science? The short answer is, find a network! Hawk Mountain has a well-established kestrel nest box program, but we aren’t the only one active in the state of PA. Throughout the state are kestrel nest box networks busy placing and monitoring boxes. You can check with American Kestrel Partnership https://kestrel.peregrinefund.org to find one near you, or contact us and we can point you in right direction. By joining boxes programs together, better regional data can be collected and help inform management techniques across the state.

An example of a nest box network formed for both American kestrel and barn owl is HARP, the Hershey Area Raptor Partnership established by Milton Hershey School (MHS) deploying boxes on their property prior to partnering with ZooAmerica. The group monitors a network of boxes primarily on, or near, MHS property in Dauphin and Lebanon counties. HARP benefits from having Nate McKelvie a licensed bander and teacher at MHS to band nestlings supplementing the monitoring performed by ZooAmerica. Initiated in 2012 the partnership started putting up barn owl boxes, only adding kestrel boxes in 2014 to stop American kestrel occupying their barn owl boxes and reduce inter-species competition. Remains of a kestrel were discovered under an occupied barn owl box that the researchers accredit to a potential box eviction.

While kestrel occupancy appears to be stable in the study area, barn owl numbers have been trending down in the past five years. HARP’s 2019 nesting report is that of their roughly 30 monitored barn owl boxes three were active. Of the 11 banded chicks 7 were from neighboring properties, so a high value region near Grantville and the remaining four were near Hershey. Banding is only of value if the individual bird gets re-encountered so HARP was excited when one of the adult barn owls was banded, see photograph. The bander was able to recapture the adult owl and determined she was originally banded in 2014 Sperryville VA as a nestling, making this female at least five years old.

HARP monitored 15 American kestrel nests in 11 of their 30 kestrel boxes and 4 of their barn owl boxes. These boxes produced 58 nestlings in 2019, 55 of which were banded. The three unbanded came from a barn owl box whose occupants were not discovered until the young were getting ready to fledge and therefore unable to be banded, but a good successful nest encounter.

For additional information on this partnerships efforts and to get updates on their season please visit their page https://www.zooamerica.com/conservation.
Thank you to the Volunteer Farmland Raptor Coordinator!

A huge thank you goes to our FLR volunteer coordinator Katie Andrews! For years she has been the primary contact person making sure the project’s momentum continued to expand and reach members of the public. Her dedication and commitment have been invaluable and we are happy that she will continue to volunteer with the project. Thank you Katie!

And to our Volunteers without whom this project wouldn’t reach across the state,

THANK YOU!

Bill Mack
Maryann Custard
John Hilbish
Sheila Miller
Elaine Briner
Thank you for reading our 2019 newsletter. This is one of Hawk Mountain Sanctuary’s initiatives to promote and facilitate farmland raptor conservation practices. It is only possible to achieve this effort through support of land owners and members of the public reporting their sightings and supplementing land practices to benefit these iconic raptors that rely on our grass and farm lands 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 2020 nesting season for farmland raptors and those who monitor them!

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

For any additional inquiries please contact

**Bracken M. Brown** Biologist-Naturalist
brackenbrown@hawkmountain.org
farmlandraptors@gmail.com
570-943-3411 ext. 103

A special thank you to all of our financial donors from 2019 who helped to build boxes and print education material.

- M.A. Custard
- A. Cramer
- E. Briner
- J. Scholtes