American Kestrel Northeast Region

3rd Annual Nest Box Program Report – 2020

Northeast region includes New England & Mid-Atlantic states: VA, VT, RI, PA, NY, NH, NJ, MA, MD, ME, DE, CT

1-18-21 final version

NYC photos by Francois Portmann https://www.fotoportmann.com/series/nggallery/series/American-Kestrels-NYC-

Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has.

Margaret Mead

Don't write what you know but what you want to know.

Anonymous

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Top 10 American kestrel nest box program states in Northeast Region 5

Data is from kestrel nest box program managers in 12 Northeast "Region 5" states from Virginia to Maine (region defined by U.S. Fish & Wildlife Service). The total 2020 banding-age nestling count of **3,439** includes new contributors not included in the 2019 count. **Counts limited to those received from contributors in both 2019 and 2020 are:**
2019 banding-age nestling count: **2,310** 2020 banding-age nestling count: **3,176** one-year % increase: **37%**

1. **Pennsylvania: 1,336** (when including only 2019 submitters 1,279 count in 2020 is up 379 from 900)
   59 by Emily H. Thomas and Don Watts in northwest PA (down 3 from 62 in 2019)
   226 by PA Game Commission, Southeast Region, led by Lauren Ferreri & Dan Mummert (up 56 from 170 in 2019)
   196 by Paul Karner and Jere Schade in Northampton County (up 47 from 149 in 2019)
   294 by Steve Eisenhauer in Centre, Mifflin, Huntingdon & Juniata Counties (up 164 from 130 in 2019)
   29 by Shaver's Creek Environmental Center around State College, led by Jon Kauffman (up 17 from 12 in 2019)
   26 by Jim Moffett in Chester & Berks Counties (up 12 from 14 in 2019)
   88 by Hawk Mt. Sanctuary in Berks County, led by JF Therrien (up 8 from 80 in 2019)
   71 by Hershey Area Raptor Partnership, led by McKelvie, Holzman & Becker (up 12 from 59 in 2019)
   253 by Devich Farbotnik in Bucks County (up 47 from 206 in 2019)
   37 by Jere Schade and Steve Benningfield in Bucks County (up 19 from 18 in 2019)
   23 by Central PA Conservancy (first year program led by Steve Eisenhauer and Ben Mummert)
   34 by PA Game Commission, Northcentral, led by Mario Giazzon (incomplete count, first year)
2. **Virginia: 696** (Morrows' and Jones/Willliams counts are up 131 from 371 in 2019)
   283 by Lance & Jill Morrow in Shenandoah Valley (up from 270 in 2019)
   219 by Roger Jones & Alan Williams (up 118 from 101 in 2019)
   194 by Highland County Kestrel Project, led by Patti Reum (a conservative count estimate)
3. **New Jersey: 352** (up 109 from 243 in 2019)
   35 by Friends of Hopewell Valley Open Space (up 23 from 12 in 2019)
   8 by Raritan Headwaters (down 2 from 10 in 2019)
   108 by Natural Lands in southern NJ, led by Steve Eisenhauer (up 38 from 70 in 2019)
   146 by NJDEP/ESP in central and northern NJ, led by Bill Pitts (up 42 from 104 in 2019)
   55 by John Smallwood in Sussex and Warren Counties (up 8 from 47 in 2019)
4. **New York: 311** (up 62 from 249 in 2019)
   293 by Mark Manske in northern NY (up 73 from 238 in 2019)
   18 in western NY
5. **Connecticut: 329** (up 53 from 276 in 2019)
   160 Northeast CT Kestrel Project, led by Tom Sayers (up 40 from 120 in 2019)
   160 Northwest and Northcentral CT Project, by Art Gingert and Mike Dudek (up 11 from 149 in 2019)
   9 by Larry Fischer (up 2 from 7 in 2019)
6. **Vermont: 148** (up 63 from 85 in 2019)
   148 by Brian Lowe
7. **Maine: 76** (St. Albans count is up 31 from 33 in 2019)
   64 by St. Albans Kestrel Nest Box Project (up 31 from 33 in 2019, led by Marek Plater)
   12 by Logan Parker (1st year data)
8. **Delaware: 13** (down 9 from 22 in 2019)
   13 by Jacque Williamson with Brandywine Zoo
9. **Massachusetts: 100** (up 25 from 75 in 2019)
   21 by Joey Mason (up 8 from 13 in 2019)
   9 by Mike Maurer (same as 9 in 2019)
   18 by Andrew Vitz in central MA (up 14 from 4 in 2019)
   52 by Kestrel Land Trust (up 14 from 38 in 2019)
10. **New Hampshire: 2** (down 9 from 11 in 2019)

New York City kestrel update

The Raptor Trust (Bird Rehabilitation Center): located in northern NJ but receives kestrels mostly from NYC

Total kestrels received in 2020: 69	in 2019: 49	in 2018: n/a	
Kestrels released or in-care	55	43	n/a
HY kestrels (nestling/juvenile)	**58**	45	43
Adults	11	4	n/a

In 2020, 46 of the 58 Hatch Year (HY) kestrels taken to The Raptor Trust came from New York City area. 12 came from New Jersey. With the difficulty in counting nesting kestrel pairs in New York City (estimates are from 50 to 100 pairs) the number of kestrels brought to The Raptor Trust from New York might, sadly, be our best gauge for the population. *Data provided by Chris Soucy*

The **Wild Bird Fund** in NYC transfers most of its kestrels to The Raptor Trust, but reports that 3 kestrels were released before being transferred, 7 were euthanized, and almost every kestrel they received in 2020 "was a juvenile who ended up on the sidewalk when first fledging". *Data provided by Rita McMahon*

In Memoriam

The "Top 10" list on page one was inspired by Roger Jones "Top Ten Karetakers" in his report from 40 years ago (see below). Roger was legendary on many levels beyond just American kestrels. Sadly, he passed away in June, 2020. Paul Karner sent me a 1980 copy of the "kestrel karetaker news". Fittingly, Paul is in the Top 10 list in both 1980 and 2020. Thanks, Paul, for keeping the kestrel nest box flame burning all these years, and for calling attention to Roger's work. Roger was sent a copy of the last two annual reports, and he was thanked for his inspiring efforts. Many more kestrels are flying around today thanks to Roger and Paul.
https://www.insidenova.com/obituaries/roger-jones/article_2193c27a-ad1a-11ea-8b4c-935f4c62e7e8.html

kestrel karetaker news

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THE TOP TEN KARETAKERS IN 1980

Name	Area	Young fledged	Male	Female	Unknown	Active boxes	Active boxes, no fledglings
John Lemon	N. Ont.	79	39	31	9	21	1
Roger Jones	N. Va.	79	34	32	13	23	3
Seth Benz	E. C. Pa.	66	29	29	8	17	1
Don & Sheila Fowler	S. Ont.	55	29	26	-	18	4
Paul Karner	E.C. Pa.	48	22	26	-	18	5
Don & Elaine Mease	E.C. Pa.	48	16	23	9	11	1
Tom Wilmers	N. W. Va.	41	23	18	-	12	2
Marshall Field	S. Ont.	41	21	20	-	20	7
Doug Keran	N. Minn.	33	12	21	-	10	?
Wm.-Highhouse	NW. Pa.	24	6	10	8	6	0
Top Ten totals		514	231	236	47	156	24
Other Kestrel Karetakers		70	20	19	31	34	15
Grand Total		584	251	255	78	190	39

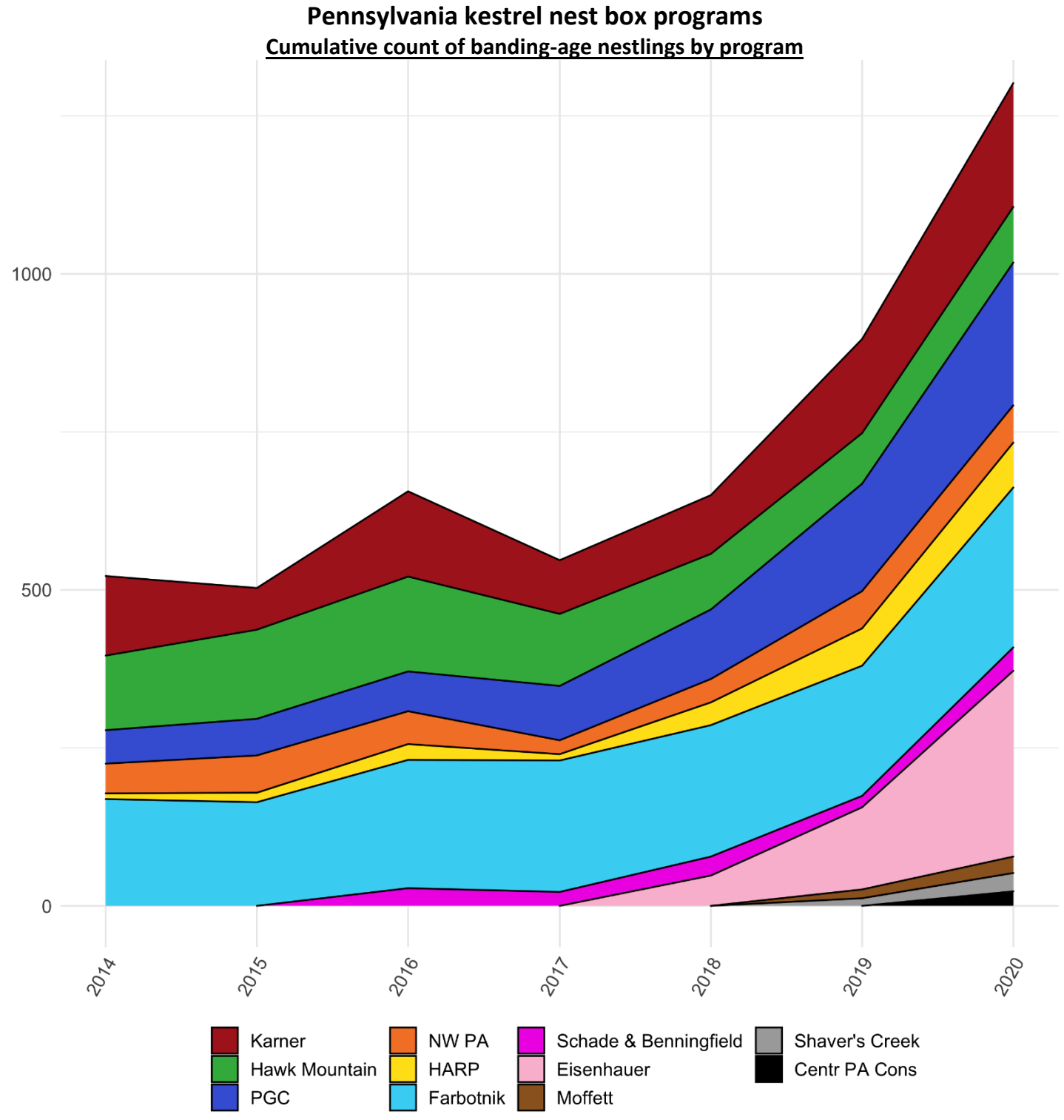
Of note is that production per box in 1980 – 584 young in 190 active boxes with 39 failures – is 3.1 kestrel fledglings per box. As addressed later in this report, production per box is a key measure of success that highlights the sink/source concern: are nest boxes producing enough young to sustain and grow a population?

State graphs

Hawk Mountain Sanctuary in Pennsylvania has a kestrel nest box program with 70 years of history. Paul Karner has been managing his kestrel boxes, with family and illness breaks, for over 40 years. Other programs and individuals have long histories with kestrel propagation and research. Recordkeeping over the decades has often been good, but not always. Consequently, the graphs in this report should be viewed with constructively-critical eyes. They are not ready for scientific journal publication, but are drafts in need of more work, and are designed primarily to:

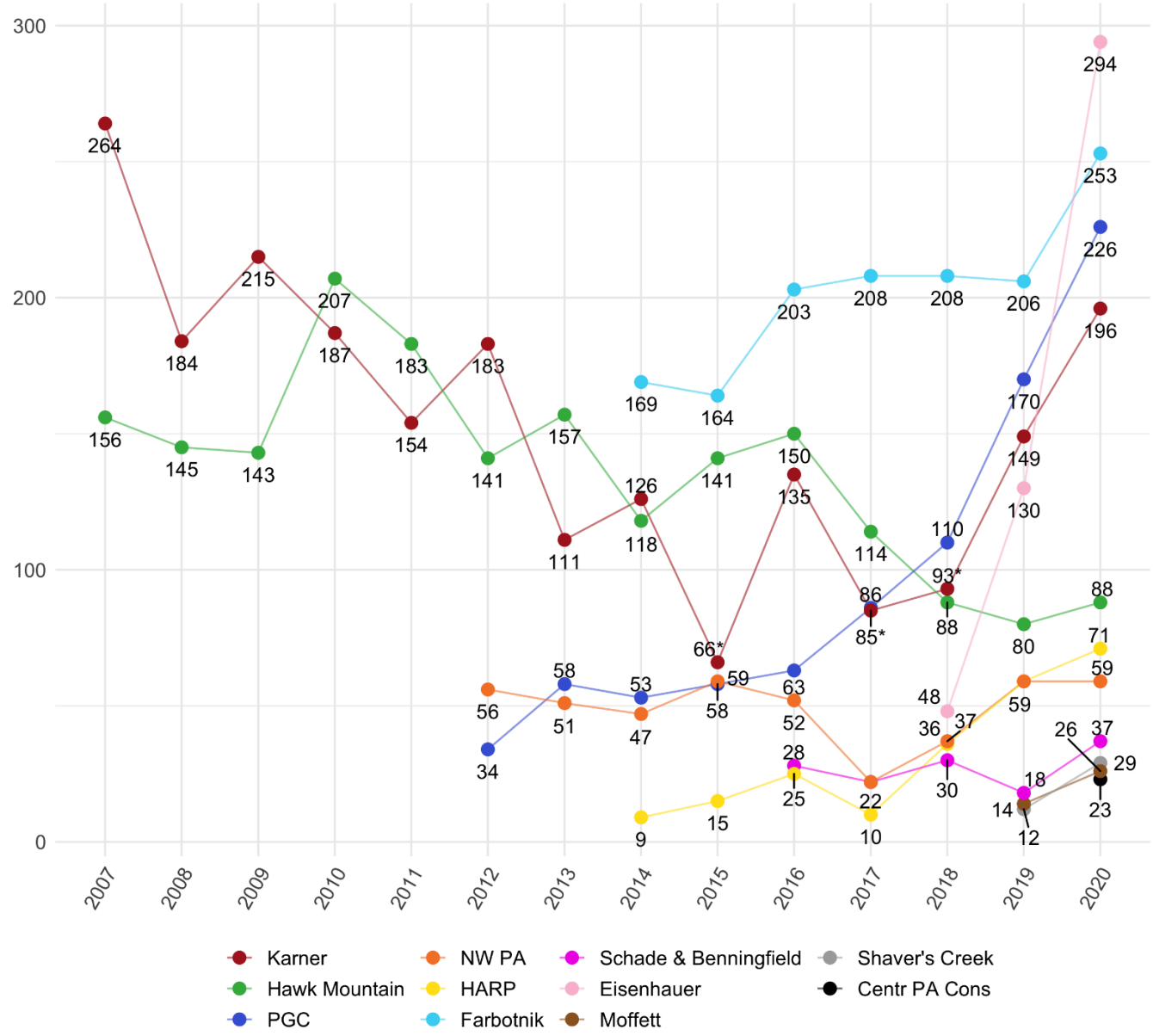
1. Recognize the work of involved individuals and programs, and emphasize the value of good recordkeeping
2. Reflect apparent trends as accurately as possible
3. Help establish some consensus on measures (e.g, when to count a chick/nestling/fledgling, and where the line is between a sink and a source box)

All report contributors provided data for chicks produced per year, and some also included data on successful vs. failed boxes. The graphs reflect this inconsistency. Another obvious inconsistency is the missing data looking backward from the past few years. Nest box programs and managers have come and gone, sometimes with little trace left behind. Lessons can be learned from collecting and analyzing as much of the available data as possible. Note that this report uses "chicks" and "nestlings" as interchangeable words, since report contributors have used both words to describe kestrel young in nest boxes. "Banding-age" in this report is set – somewhat loosely – at 15 days. This loose definition is addressed later in the report.



** incomplete data for Karner in 2015, 2017, and 2018 and for PA Game Commission in 2020*

Total PA banding-age nestling count by program



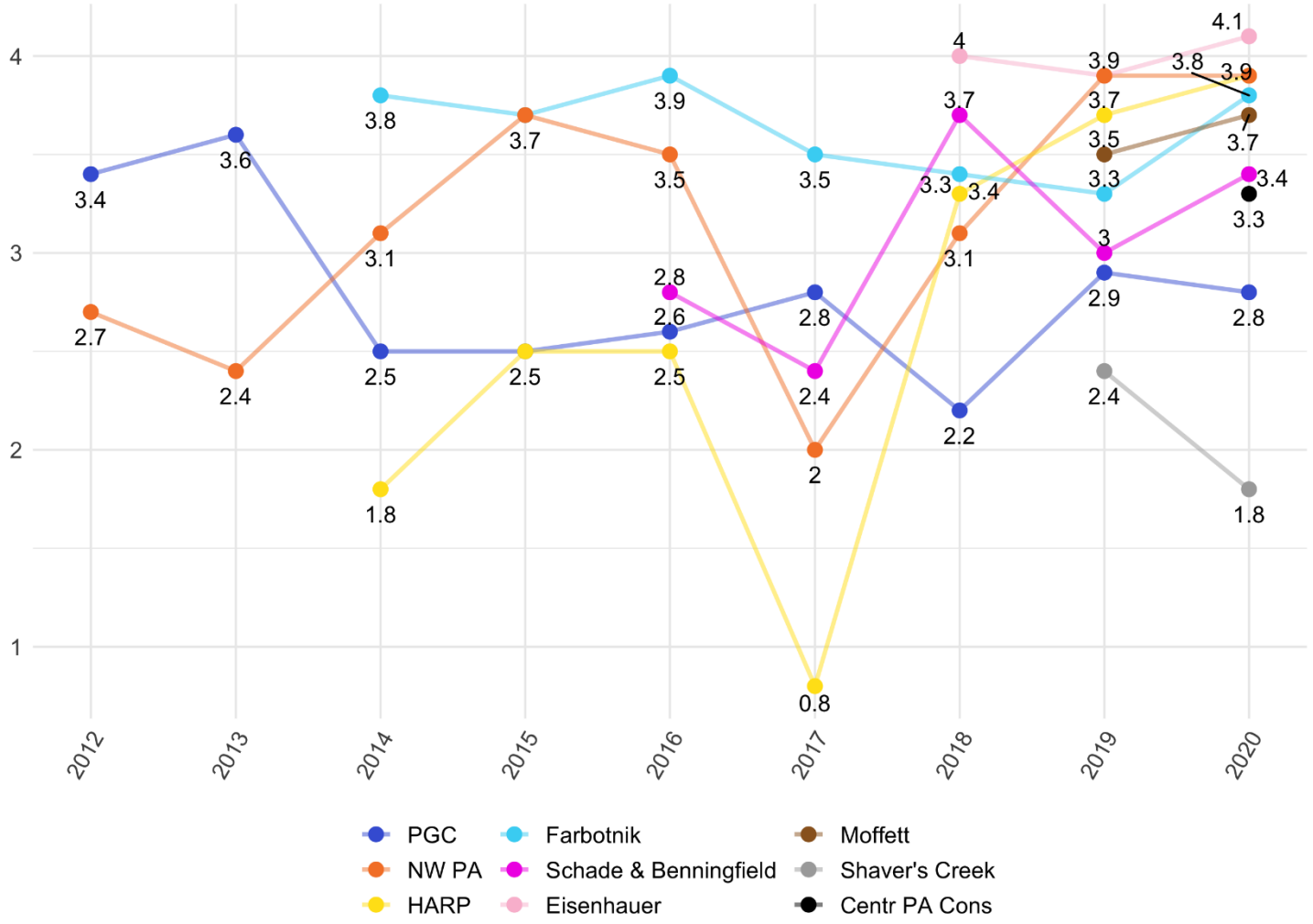
** indicates incomplete data*

Key

- Karner – Paul, with Jere Schade's help, manages a kestrel nest box program in Northampton County
- Hawk Mountain – Sanctuary in Berks County has operated a kestrel nest box program for 70 years
- PGC – Southeast region's program is furthest along in development with the Northcentral region close behind and other regions also developing programs with banding expected to start in the near future
- NW PA – Emily H. Thomas and Don Watts are based in northwest PA, and a bit into NY state
- HARP – Hershey Area Raptor Partnership (Nate McKelvie, Ann Holzman and Tim Becker)
- Farbotnik – Devich is based in Bucks County
- Schade & Benningfield – Jere Schade and Steve Benningfield in Bucks County
- Eisenhauer – with help from Shaver's Creek Environmental Center set up program in 4 counties around State College area
- Moffett – Jim Moffett in Chester & Berks Counties
- Shaver's Creek – Environmental Center that is part of Penn State University in State College
- Centr PA Cons – Central PA Conservancy, a land trust sponsoring program led by Steve Eisenhauer

Average number of PA banding-age nestlings per nesting box by program

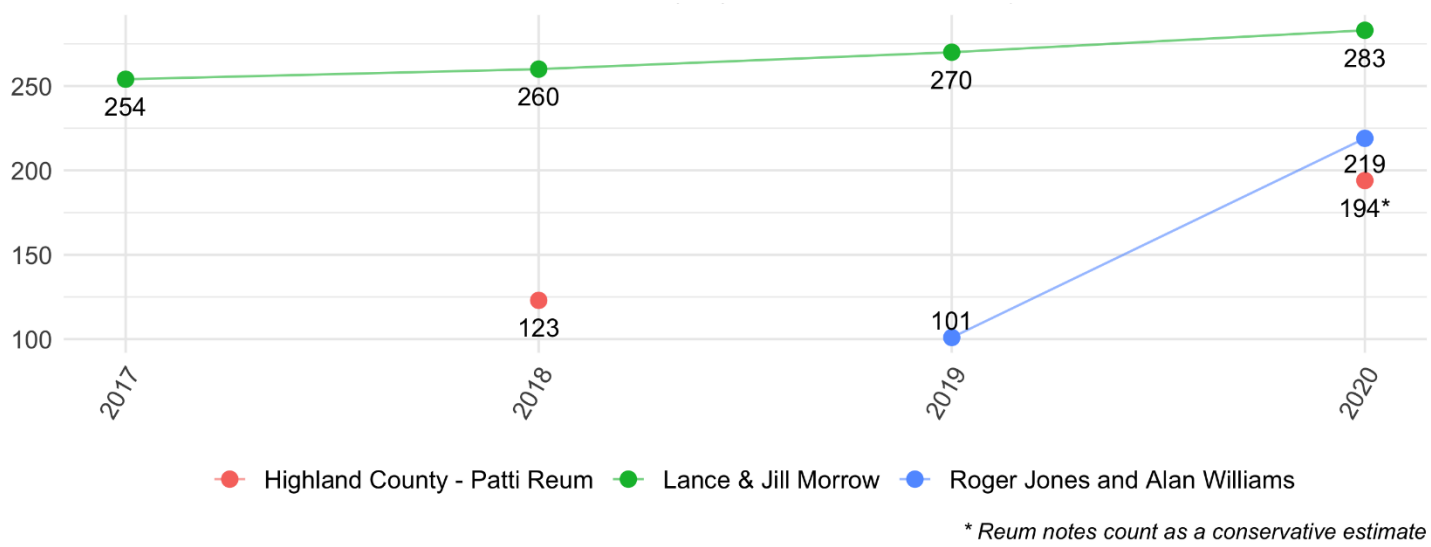
(failures entered as zeros)



All photos in report are from New York City and were contributed by Francois Portmann

Virginia kestrel nest box programs

Total VA banding-age nestling count by program

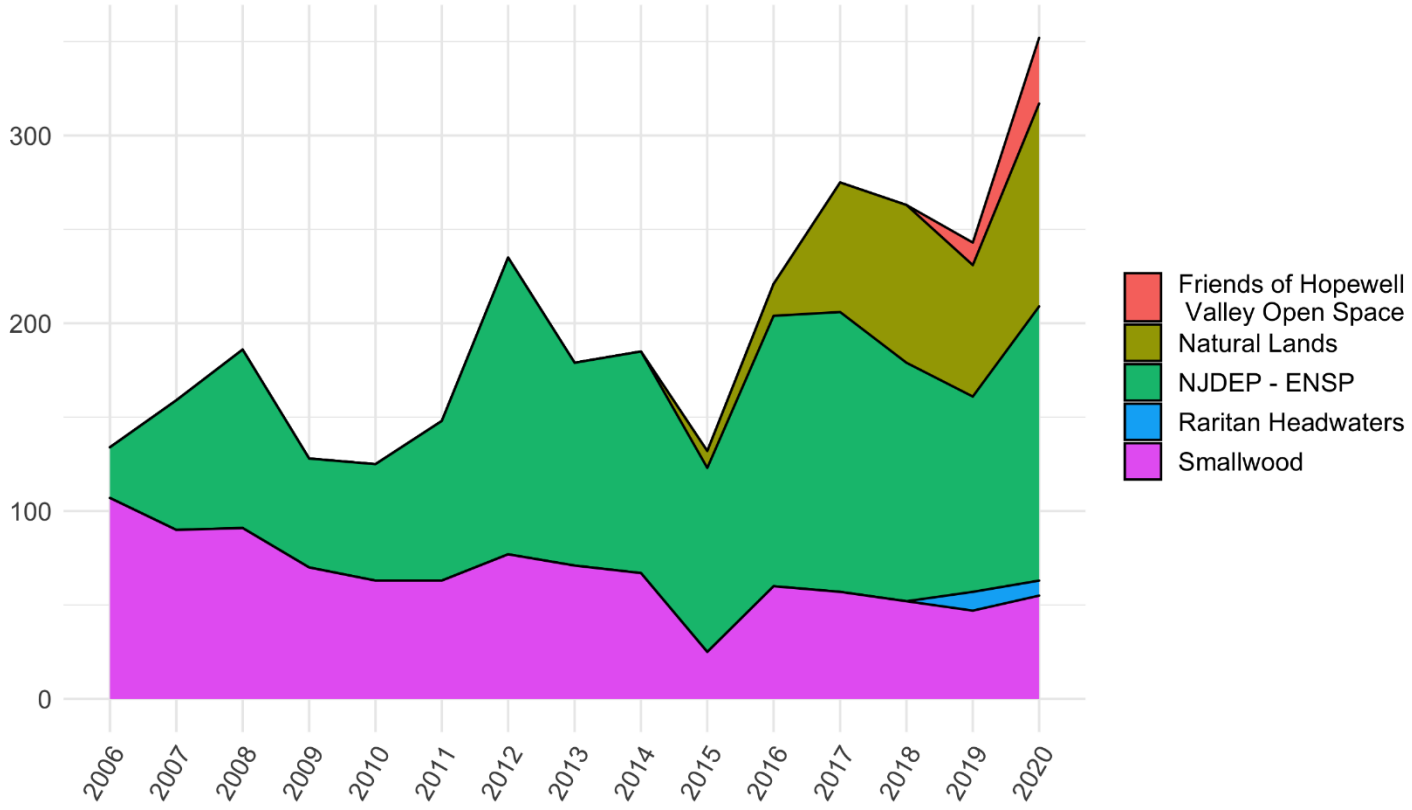


** Reum notes count as a conservative estimate*

The Virginia kestrel nest box program is in good hands with Lance & Jill Morrow, Patti Reum and Alan Williams (and Roger Jones' legacy and inspiration, of course). The Morrows hint they may be slowing down but Lance also notes: "In our old age we are trying to work smarter – not harder." This usually equates to removing infrequently-occupied and lower-production boxes, and lowering box heights to safer monitoring levels. Their 283 nestling-banded count in 2020 is the highest ever in their 13-year kestrel nest box program. Patti Reum is showing impressive progress in Highland County in monitoring boxes, all of which were installed by Dan Bieker and Reum as part of a Virginia Society of Ornithology effort to erect over 450 kestrel nest boxes. Reum is currently experimenting with closer-spacing of nest boxes. And Alan Williams is continuing the work Roger Jones initiated decades ago. Of particular note is that the Morrows' boxes are all within 8 miles of their home: evidence kestrels can be more like a colony-nesting species than often recognized.

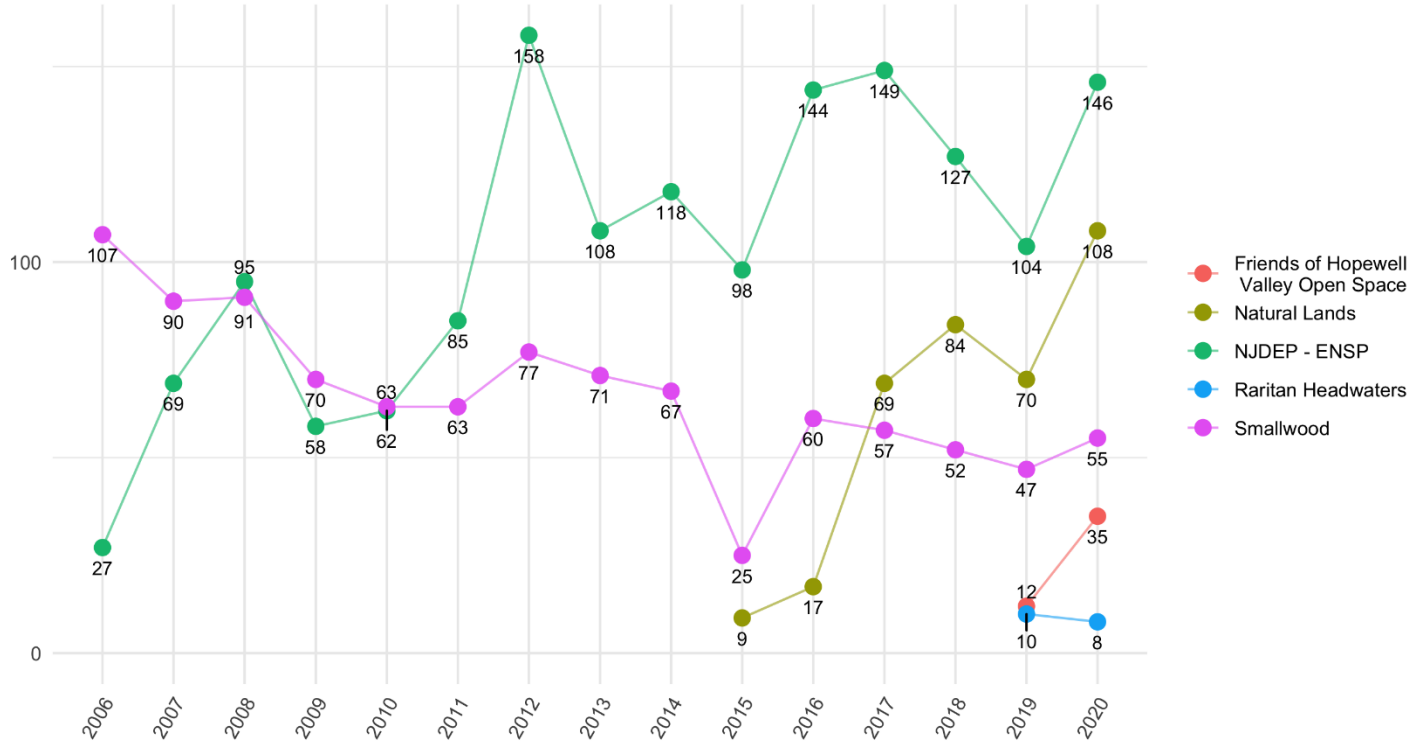
New Jersey kestrel nest box programs

Cumulative count of banding-age nestlings by program



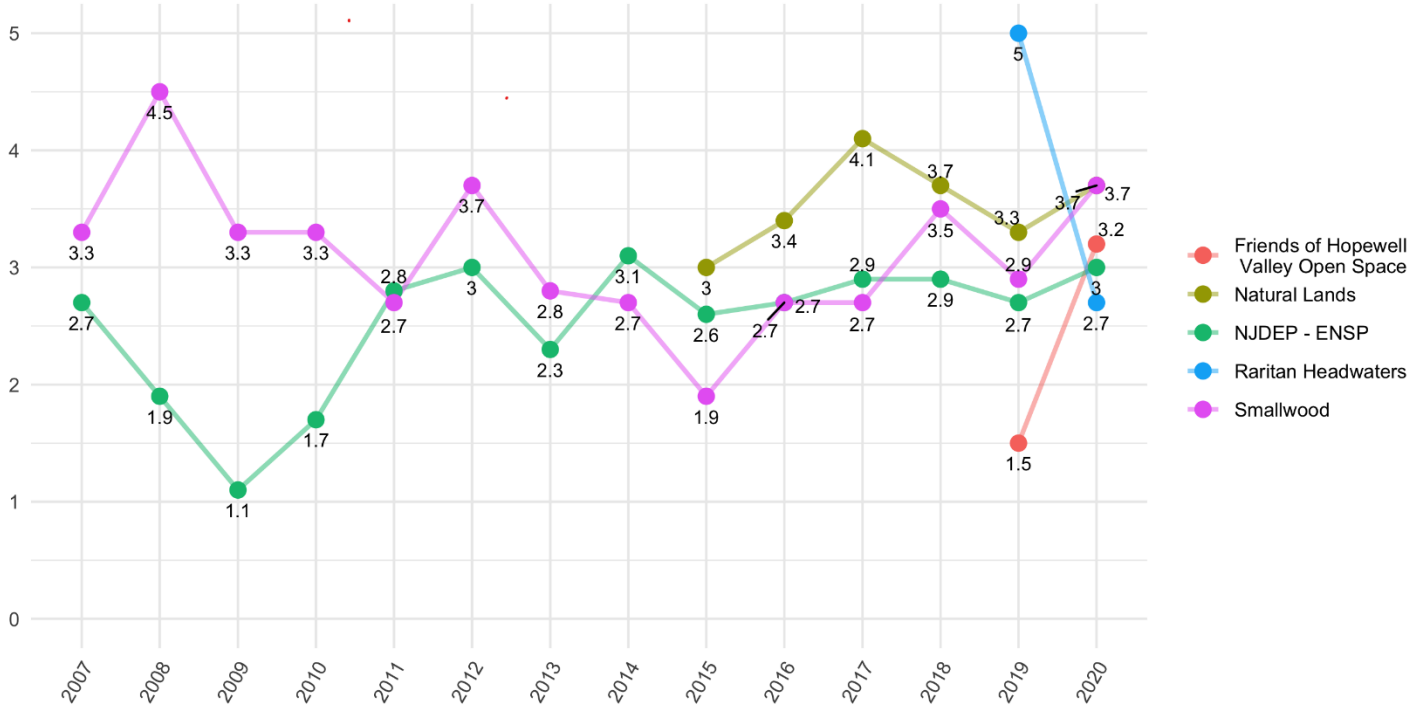
Total number of NJ banding-age nestlings per year

Total NJ banding-age nestling count by program



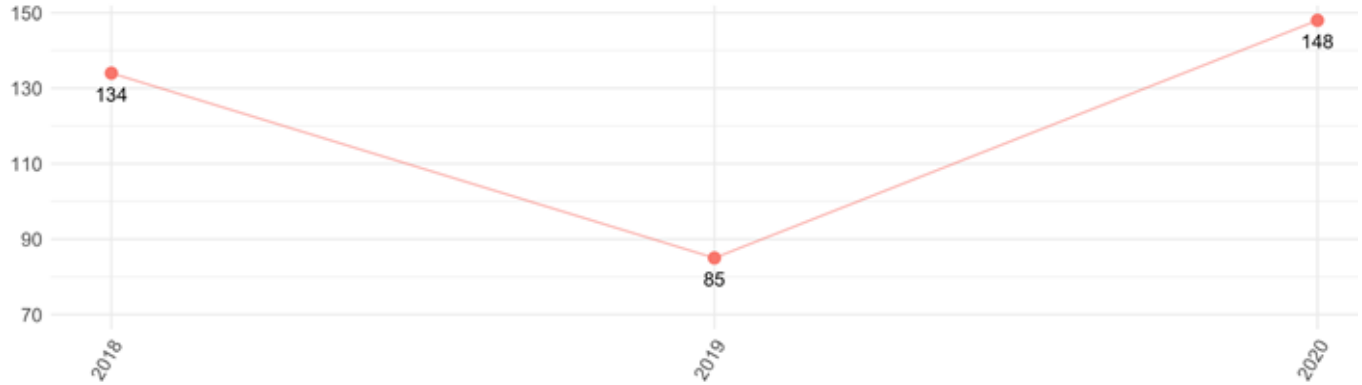
Average number of NJ banding-age nestlings per nesting box by program

(failures entered as zeros)



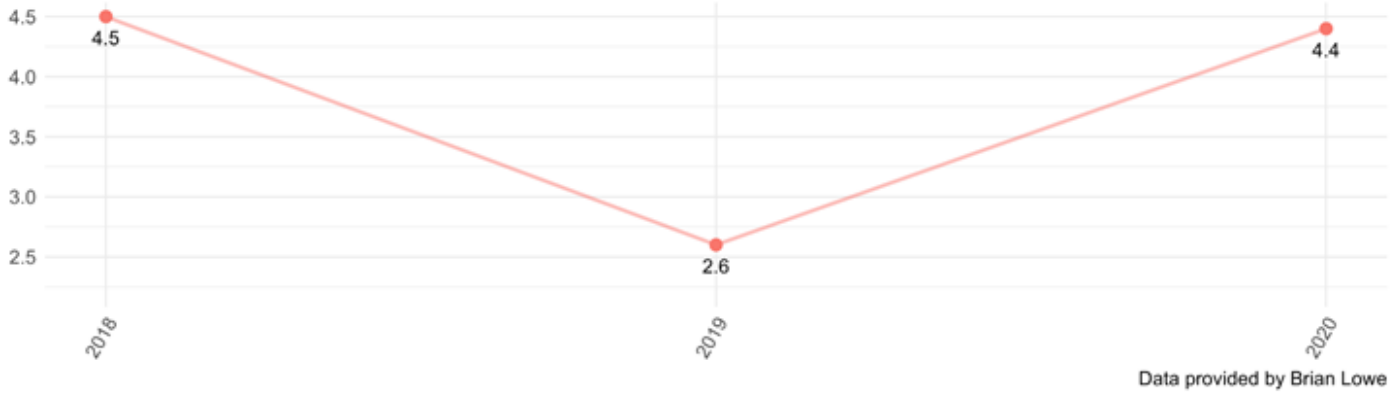
Vermont kestrel nest box program

Total count of banding-age nestlings



Average number of VT banding-age nestlings per nesting box

(failures entered as zeros)

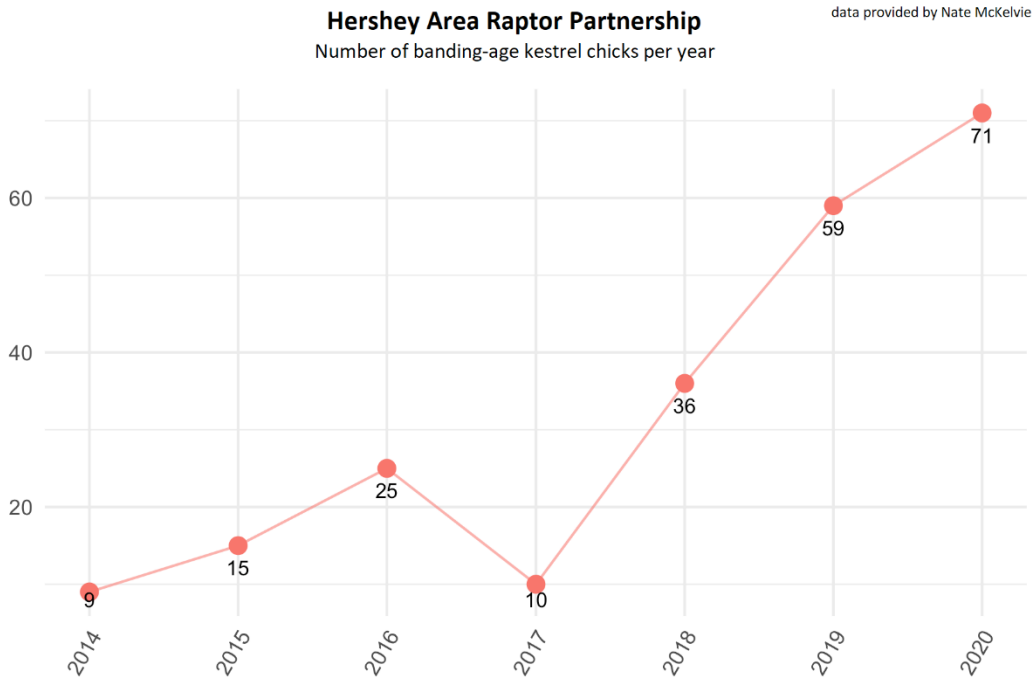


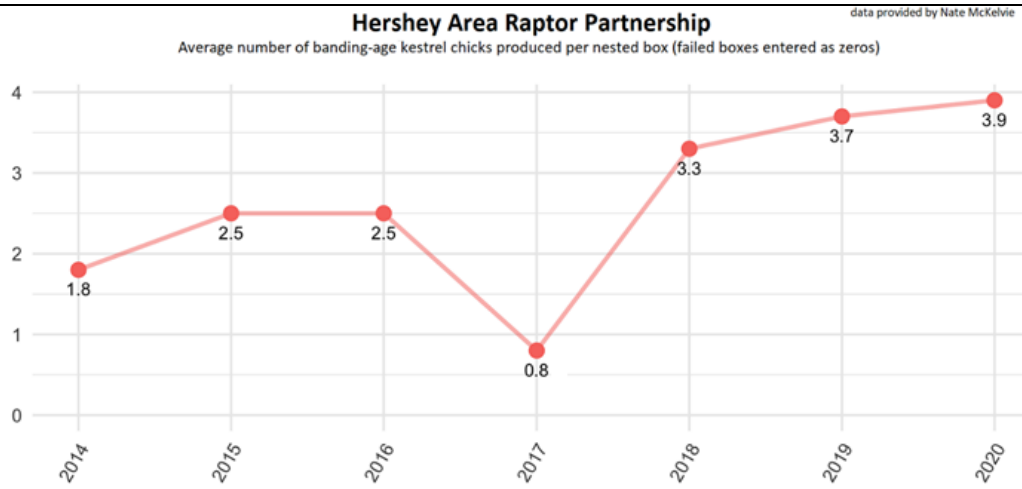
Although a similar correlation is seen in other states' graphs, the two above Vermont graphs most clearly show how a year with a low count of total banding-age nestlings aligns with a low count of nestlings per nested box. This suggests that a similar number of pairs are nesting but local environmental conditions (bad weather, low prey availability, increased predation) may be suppressing egg numbers, hatching and/or survival of hatchlings.

Ruminations on the sink/source issue

By most measures, the American kestrel is in trouble: its preferred grassland habitat with life-sustaining small rodents and large insects is dropping in area; one of its primary predators – the Cooper's hawk – is increasing in population; and its need for a cover over its nest – such as in a tree cavity or an old barn loft – is increasingly limited as farmland hedgerows with old trees and cavities are removed and wood barns are demolished or replaced by tightly-constructed steel-sided structures. Other factors undoubtedly are involved. For over 70 years, kestrel nest box programs throughout the country have been promoted to assist reproduction. Properly-constructed, mounted and maintained boxes in good habitat have been successful. But – as emphasized in last year's Annual Report – boxes can be "sources" resulting in population increases, or "sinks" resulting in decreases. Adding more source boxes and eliminating sinks is important to kestrel recovery.

Lessons are learned from failures and successes, from landowners with one nest box and from 200-box program managers. Seemingly minor adjustments can turn a sink box to a source, or a new threat or habitat change can convert a source to a sink. In 2017 Nate McKelvie, a Hershey, PA science teacher, was concerned with the production drop in his kestrel nest boxes and thought perhaps the problem was related to starlings removing most or all the wood chip bedding placed in nest boxes the previous fall. Studies have shown that some type of bedding (wood chips, shavings, straw or grass) is typically needed by kestrels, since they don't build a nest by adding material, instead relying on remains that would typically be found in a natural tree cavity bottom. Eggs laid on bare wood often fail to hatch, probably due to the likelihood they've rolled around and become addled as nest boxes sway in the wind, and also due to a lack of heat-retaining insulation on the wood floor. One adjustment McKelvie made for the 2018 season – adding/replenishing a 3 to 4-inch chip layer in late winter just before nesting season – may have moved his boxes more clearly to source status, as shown in the two following plots.





An especially revealing box bedding finding with the Varlan and Laughin (1993) study in Iowa involved kestrel nest boxes mounted on rigid steel I-beam of interstate highway signs, essentially eliminating the box sway variable. They found that: "In our study, all 12 clutches on a substrate of bare wood failed during the incubation stage. Egg chilling due to insufficient substrate for insulation probably was the primary reason for egg failure on bare wood." The value of bedding substrate to insulate eggs from cold wood floors may be more important than generally recognized.

A time-saving nest substrate solution is one that mirrors kestrel nests in natural cavities. Two of the most experienced kestrel nest box managers – the Morrows in VA and Mark Manske in NY – have stopped cleaning out their boxes every year, instead relying on the previous year's remnant substrate (personal communication 2020). Nest box production may vary little with most kinds of substrate, as long as some kind of insulating layer is available for kestrels to scratch out a hollow for egg placement and to more-easily keep eggs together during incubation.

What about ectoparasites when boxes aren't annually cleaned out? The accepted belief is that annually removing old bedding, fecal and food debris reduces nest parasites – like fleas, mites, blowflies and lice – that can hinder reproduction. But haven't birds co-evolved with these parasites for many thousands of years? In *Are avian ectoparasites more numerous in nest boxes with old nest material?* Rendell and Verbeek (1996) "recommend caution when speculating about the possible effects of cleaning boxes on parasites that occur in nests because different species of parasites are not influenced similarly by old nests". Annual substrate removal and replacement, especially when undesirable species like starlings and house sparrows have fouled a nest box or filled it with excessive nest material, is still recommended. But it would be interesting to see a study where the substrate in successful kestrel nest boxes is replaced compared to successful boxes where the debris is left in place. Production may be similar in many locations.

Where is the line between a sink and a source box? Often, it's clear. One of Emily Thomas's boxes in northwest PA has had kestrels successfully nest in it for nine consecutive years with an impressive average of 4.8 chicks/year: clearly a source box. Another box in good habitat that attracts a kestrel pair each year but located where a black snake annually climbs up to eat all the eggs or young, would clearly be a sink box; but an effective snake guard or relocation of the box at the same site can switch this box to source status.

More often the line is not clear. One arguable line drawn is: a kestrel nest box averaging three chicks or more per box per year is a source, whereas one below two is a sink. The boundary line between two and three depends on geography and local conditions. Jacobs (1995) suggests this line may be closer to three per box:

> *To estimate the recruitment standard for kestrels, Henny (1972) calculated an annual mortality rate of 69% for yearlings and 47% for adults from band returns. He assumed that 82% of the yearlings and all the adults attempted to breed. Based on these assumptions, Henny believed with 73% of the nests successful, each breeding female must produce 3.92 young per successful nest for the population size to remain constant. Seventy-seven percent of the band recovery data used to determine the recruitment standard came from northeastern United States, including Wisconsin. My average of 4.1 young per successful nest with 70% of the nests successful is similar to Henny's recruitment rate of 3.92. My results do not account for renest attempts and are probably a conservative estimate of actual productivity for each breeding female. These long-term data suggest the kestrel population was stable on my study area.*

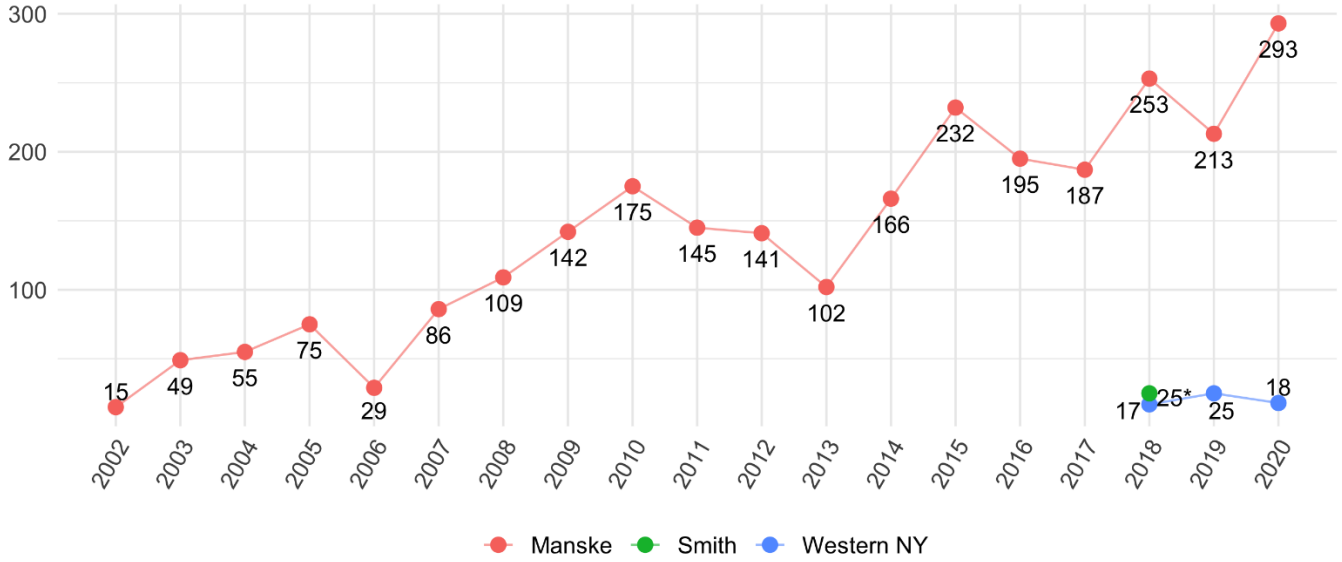
The noted 70% nest box success rate and 4.1 young produced per successful nest calculates to 2.8 chicks per nested box. With kestrel mortality rates in their first year around 70% and an average adult lifespan of not much over one year, addressing the sink/source concern with nest boxes can mean the difference between hastening the kestrel decline and assisting its rise.

Banding-age kestrel chicks are often considered to be 15 days old or older. Counting fledglings that make it out of the nest is very difficult, since they fly from nests at various times and it's essentially impossible to have someone stationed at every box to count and identify each first flight. But banding-age chicks are easy to count, since at 14 to 15 days old nestlings start to show a brown back color in their fluffy white coat. For licensed bird banders who can handle birds, sex determination is possible at this age. Even without the banding permit required to handle nestlings, a box manager can look or put a camera in a box and identify kestrel nestlings' age as above 14 days. So, arguably, chicks 15-days-old or above is a reasonable measure in acquiring relevant data from both individual nest box landlords and from program managers with banding permits or access to licensed banders.

Data from historical and current long-term programs is helpful when examining the sink/source issue. Geographic differences are relevant, particularly when some kestrel nesting populations are migratory, others are not and many are a blend. The northern NY Adirondack Raptors program led by Mark Manske shows an 18-year rise in population, with a similar rise in production (see following graphs). His kestrel production appears to be self-sustaining and is likely producing many kestrels to spread far beyond his study area, even with a 1.6 chicks per nested box ratio his first 12 years.

New York kestrel nest box programs

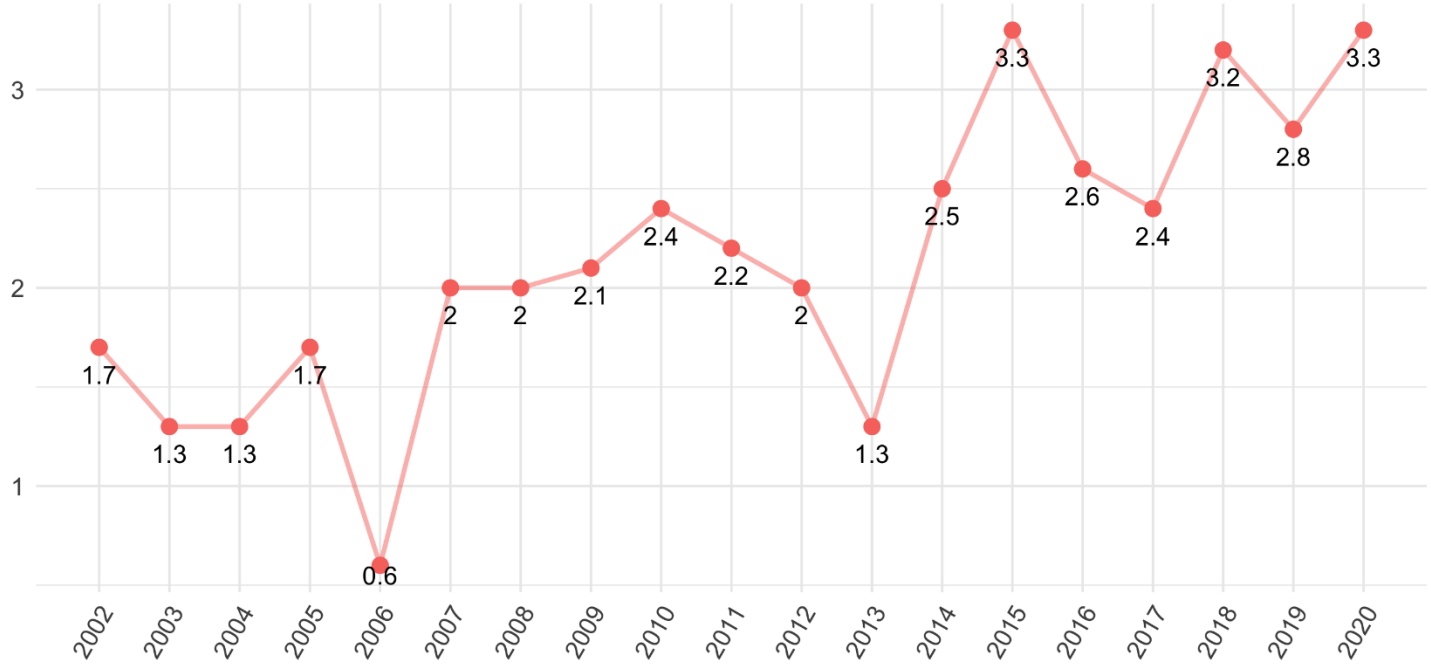
Total NY banding-age nestling count by program



Data provided by Mark Manske and Zach Smith.
** Smith's boxes in southern NY around the Shawangunk Grasslands National Wildlife Refuge continue to be maintained but nesting data has not been reported for 2019 or 2020.*

Average number of NY banding-age nestlings per nesting box in Manske program

(failures entered as zeros)

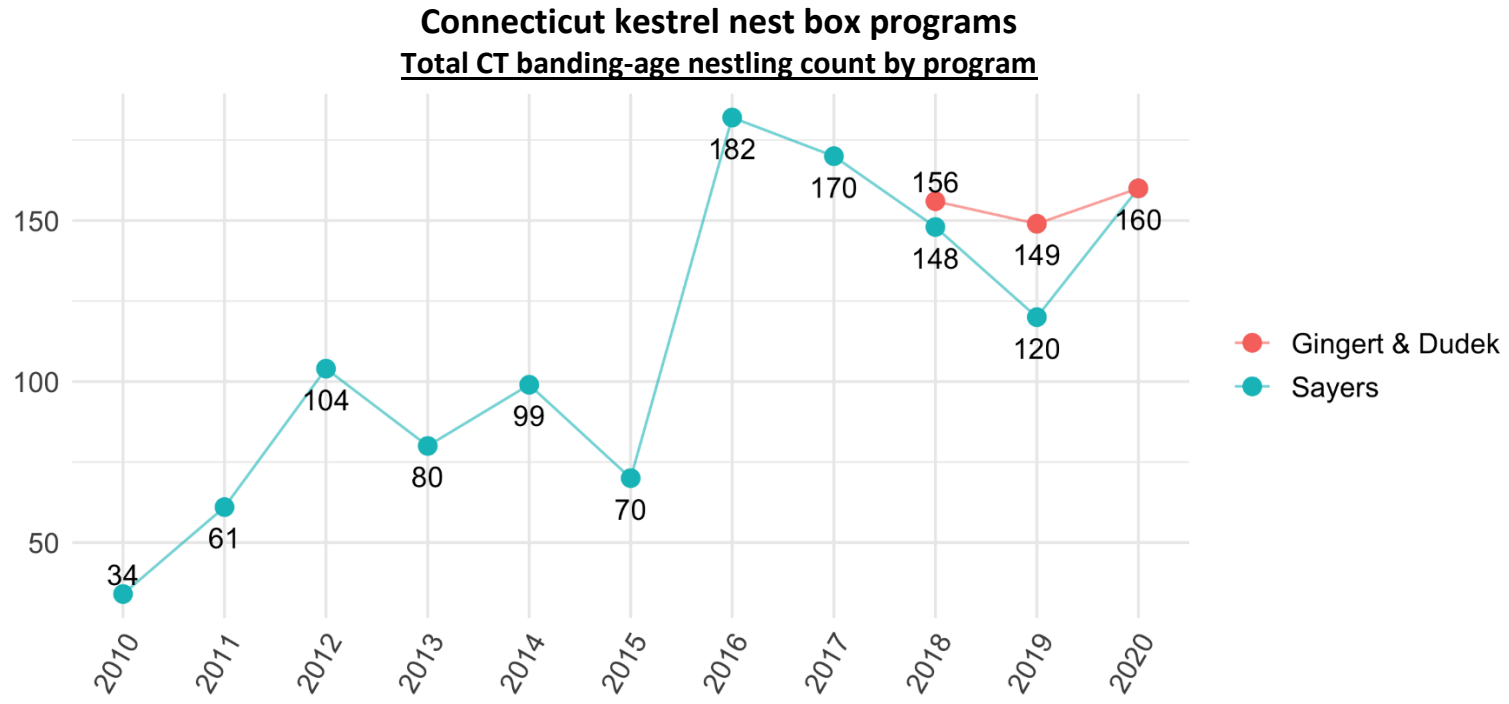


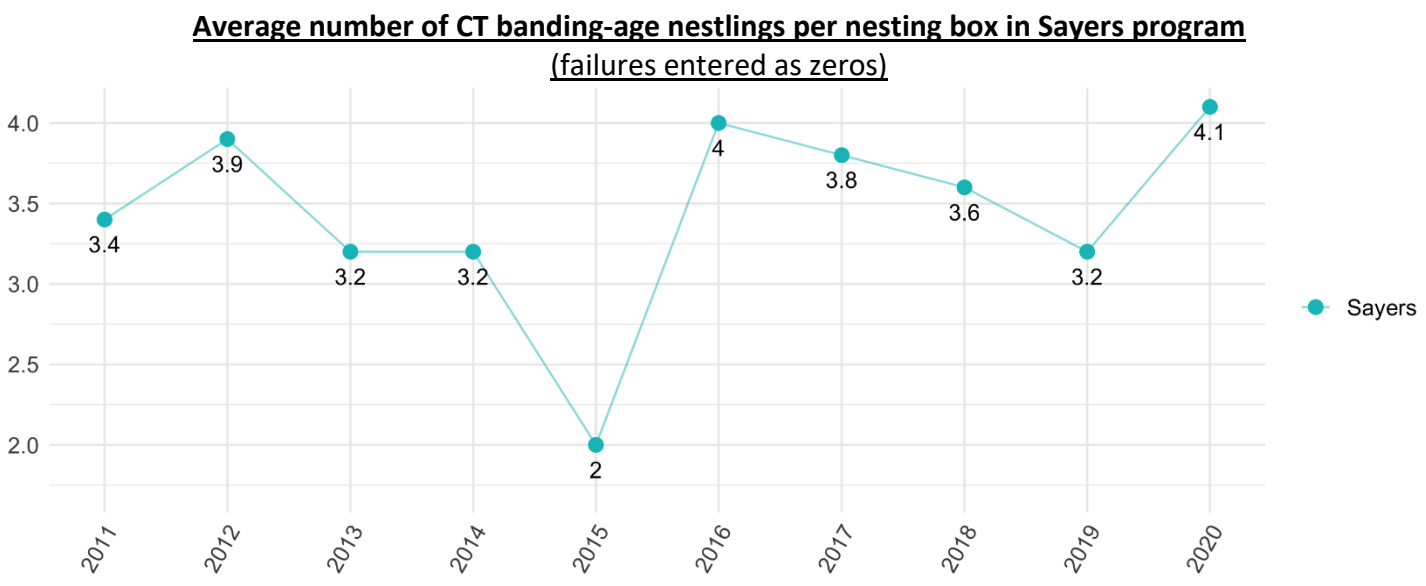
Data provided by Mike Manske in northern NY

Acceptance of Inconsistency

Inconsistency reigns when nestlings are counted, complicated by the struggle many nest box managers have in finding time and resources to manage boxes. Most managers are either volunteers or utilize volunteer help. Consequently, the complexity, time requirements and disturbance associated with some monitoring approaches creates the need for a simpler, less-invasive option that still produces usable data. Statisticians sometimes preach "the only thing worse than no data is bad data". Good data is obviously preferred but, often, pretty-good data is also valuable and acceptable, particularly when it is data any landowner or interested individual can quickly understand and collect. A count of 15-day or older chicks is pretty-good data that may be as accurate as many of the historical counts of nest box "fledglings" that were not all confirmed to have flown from the nest box. The concern with premature fledging caused by box checks late in the 30-day nestling maturity cycle may minimize any increased accuracy gained from late nest box checks.

Tom Sayers' Northeast CT Kestrel Project shows progress similar to Manske (see below graphs). Any examination of these graphs calls attention to possible issues with the utilized measures. "Chicks per nested box" – with chick defined in this report as a nestling 15-days or older – is a clear measure, but few past and current box managers have consistently used this definition. In *Suggestions for Calculating Nest Success*, Mayfield (1975) presents a solution often referenced, but it is relatively complex and not designed specifically for kestrels. Mullican (2018) studied kestrels in Texas, utilizing 24-days-old as "an acceptable standard for raptor ecologists, as it is the age after which mortality is lowest for nestlings prior to leaving the nest" (Steenhof and Newton 2007). In an Idaho study, Steenhof and Peterson (2009) "considered the number of young in broods with nestlings >21 days to be the number that fledged". In *Estimating Raptor Nesting Success: Old and New Approaches,* Brown et al (2013) address this issue as it applies to kestrels. *Modeling nest-survival data: a comparison of recently developed methods that can be implemented in MARK and SAS* (Rotell et al 2004) is another source regarding sophisticated nest box monitoring models and methods.





Double occupancy/brood or renest

Double broods by the same kestrel pair in the same season are rare in the northeast states. Over 12 years, Lance and Jill Morrow in Virginia had 19 second nest attempts where both females were identified: 6 were second broods by the same female, and 13 were double occupancies by different females (personal communication 2020). Although this is a small sample size in an area where nearly all nesting kestrels are non-migratory, it suggests double broods may be even rarer than some reports indicate. In central PA in 2020, of 80 active boxes Eisenhauer reports six possible double broods: four were renests in the same box, and two were nests in adjacent boxes within two weeks after chicks fledged in an immediately-adjacent box. Without accurate identification of females, no double brood determination can be confirmed, which complicates the calculation of chicks per nested box.

Assuming one-third of the renests are double broods – as suggested by the Morrows' findings – might work for the Virginia geographic area. Steenhof and Peterson (1997) reported "there have been no reports of double brooding by kestrels north of 40 degrees latitude" but did document one kestrel double brood by the same pair in different nest boxes, in Idaho in 1996, which resulted in 10 fledged chicks. Green (2016) – through close observation and extensive photographs – documented successful double brooding with an urban kestrel pair in Providence, RI. Although double broods are uncommon, especially in northern latitudes, the situation is clouded not only by infrequent captures of both female parents, but also by documented and suspected renesting in different boxes (or a natural cavity in addition to a nest box).

Concluding thoughts

Nest box success

The 37% one-year increase in kestrel chicks in the northeast region nest boxes is significant, considering that only contributors from both 2019 and 2020 are reflected in this tally. Suggested explanations for this dramatic rise include:

- COVID virus restrictions have greatly reduced vehicle traffic on roads. Kestrels are common roadside hunters, usually perched on utility wires while searching for prey in grassy right-of-way margins and adjacent farm fields. Reduced traffic converts to fewer kestrels killed by cars and trucks.
- The 2019-2020 winter weather was mild, with snowfall levels generally below normal. For example, Harrisburg, PA – where 31 inches is the 40-year average – had 5.1 inches of snow. Mild winters can result in more prey availability for both wintering and breeding kestrels.

Birding with a purpose

One of Fran Hamerstrom's best-known books is *Birding with a Purpose,* a title that defines kestrel nest box management: the effort to observe and enjoy birds while also working hard to help a species reverse its decline. Some of the contributors to this year's annual report have worked with, learned from and been inspired by in-person contact with Fran along with her husband, Frederick. Mark Manske trained under the Hamerstroms in the 1980s at the University of Wisconsin in Steven Point, experiencing first-hand the flamboyance and wisdom of Fran, and her passion for kestrel propagation and research. Lance Morrow banded innumerable raptors with Fran when he was a student in Texas, where the Hamerstroms wintered later in life. Art Gingert stopped at the Hamerstrom's Wisconsin farm one summer many years ago, and found himself helping one of their assistants monitor kestrel boxes. John Smallwood describes in detail an educational encounter he had with Fran in the 2013 book *Hamerstrom Stories*, authored by her daughter, Elva. The Hamerstroms live on today through the kestrel knowledge and inspiration they've sown in many of us. Entertaining and educational books by and about the Hamerstroms are still available for purchase online.

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