NORTHERN SHENANDOAH VALLEY AUDUBON SOCIETY
BLANDY BLUEBIRD TRAIL

ANNUAL REPORT
2021

Kaycee Lichliter
Trail Manager

The following is a brief compilation and analysis of data from the Shenandoah Audubon/Blandy Bluebird Trail at Blandy Experimental Farm, which includes data collected between 2004 and 2021. However, no data was collected during the 2020 season due to the COVID-19 pandemic during which time the Arboretum grounds were closed to the public. The data and conclusions may be subject to interpretation. Views expressed by the author does not reflect the opinions of Northern Shenandoah Valley Audubon Society or Blandy Experimental Farm.

Photo credit: Marie Majarov

In memory of Trail Technician George Pryor "Eric" Williams, Jr.
1928 - 2021

This report may be cited as follows:
Lichliter, Kaycee D. 2021. *Northern Shenandoah Valley Audubon Society – Blandy Bluebird Trail – Annual Report 2021*, under the auspices of NSVAS and Blandy Experimental Farm, Clarke County Virginia.
For further information pertaining to this project, please contact Kaycee D. Lichliter, Trail Manager, at kayceelichliter@hotmail.com

ACKNOWLEDGEMENTS

The Shenandoah Audubon/Blandy Bluebird Trail project is coordinated and operated solely by volunteers. The trail is maintained on the grounds of The University of Virginia's Blandy Experimental Farm. Funding is provided by The Northern Shenandoah Valley Audubon Society. Many dedicated individuals have given their time and energy to this project over the years and I extend my sincere appreciation to each and every one.

The 2021 trained trail technicians were:

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Kaycee Lichliter, Trail Manager (2004-present)

Photo credit: Kaycee Lichliter

Trail Technician Alyce Rideout prepares to open nesting box for inspection.

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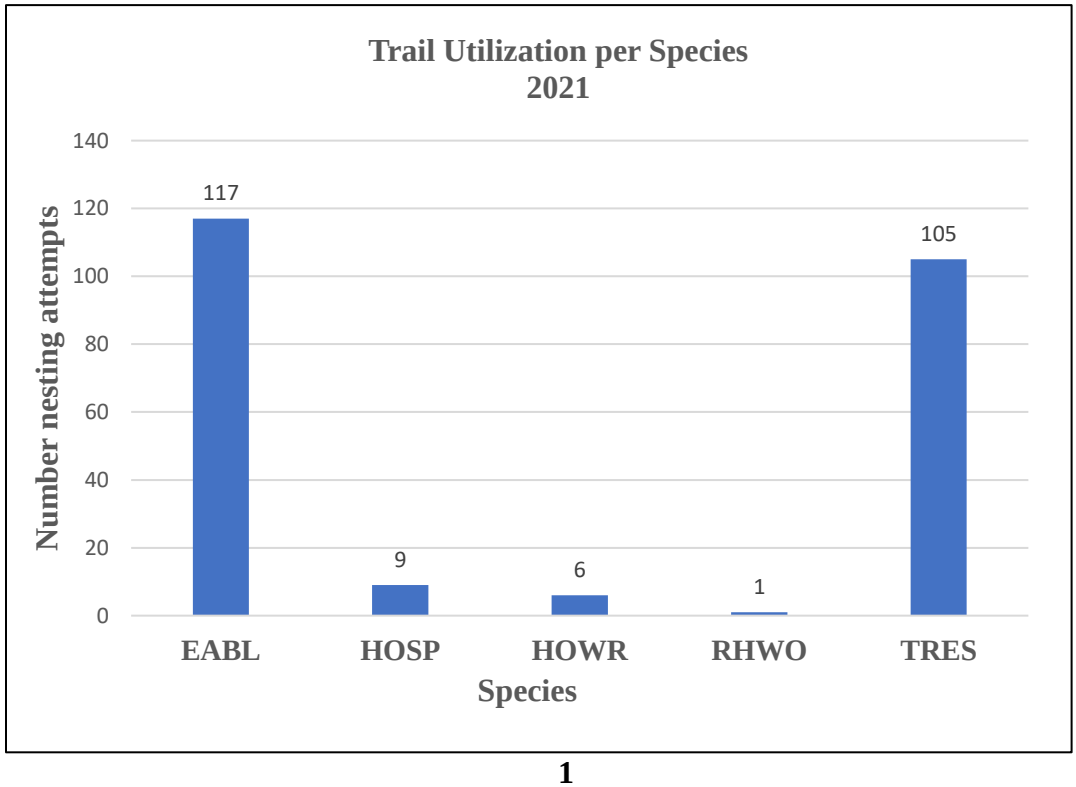
Monitoring/Training

The Shenandoah Audubon/Blandy Bluebird Trail 2021 monitoring season was the 24-week period, 19 March through 28 August. Due to the COVID-19 pandemic, no pre-season training or refresher workshops were offered to volunteers, which had always been our standard procedure in years past, and no new volunteers were accepted into the program for this same reason. By following the strict guidelines of the protocol, and with close communication between trail manager and technicians, the project ran smoothly and valuable data was gathered by the 34 trail technicians.

Trail Utilization per Species (Nesting Attempts)

Not only did the Eastern Bluebird (EABL) utilize the trail over the last 18 years, but we also had multiple other native cavity-nesting birds, to include Carolina Chickadee (CACH), Carolina Wren (CARW), House Wren (HOWR), and Tree Swallow (TRES). All these species have not attempted nesting on the trail each year. This season the EABL made a record high, 117 nesting attempts, with TRES trailing with just a few less at 105. HOWR dropped to a low of only 6 nesting attempts. If you note on the Trail Utilization per Species 2021 graph below, we documented a new species that attempted nesting on the trail this season; the Red-headed Woodpecker (RHWO). More detailed documentation follows in this report. The non-native House Sparrow (HOSP) continues unsuccessful nesting attempts due to human control methods.



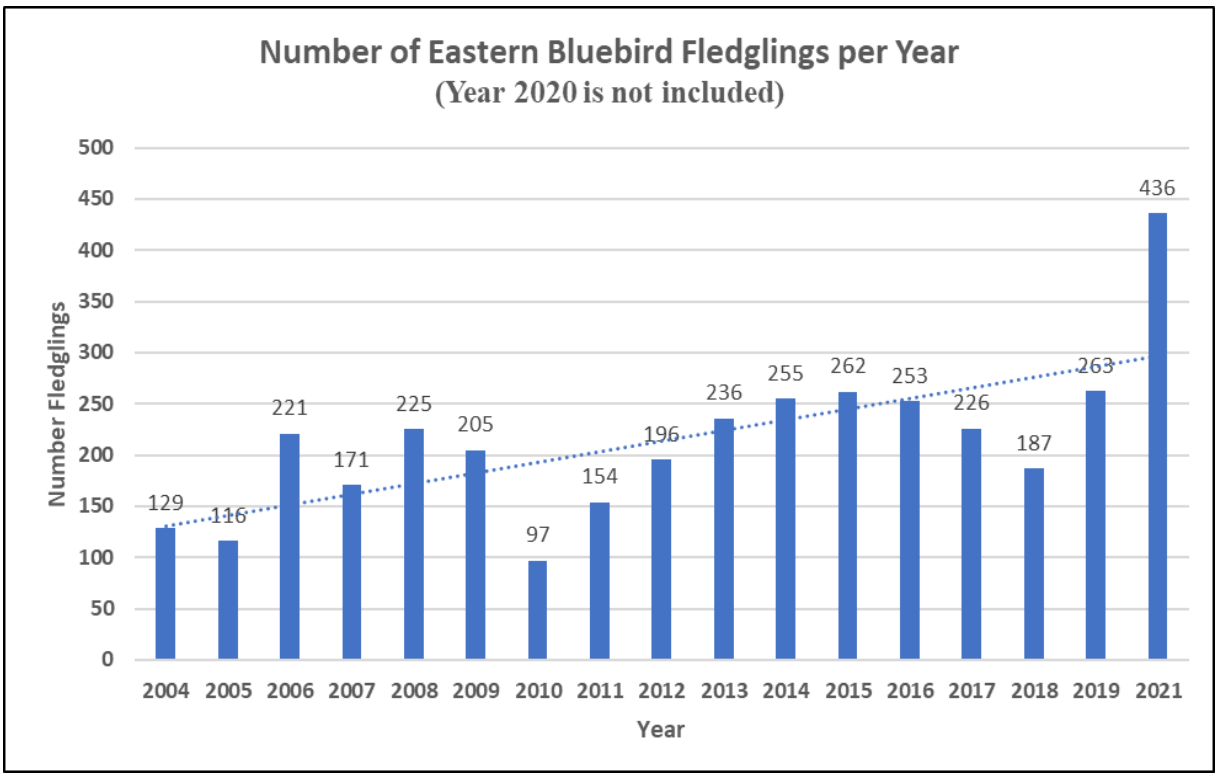
Eastern Bluebird Fledglings per 18-Year Period

The chart below depicts the number of Eastern Bluebird fledglings per year for the past 18 years (2020 was not documented). The 2021 season appears to be our most productive year to date with 436 fledglings recorded.

One could speculate that the EABL 2021 fledgling population boom may be related to the 17-year Cicada population and the resultant higher food availability.

In reference to the 2010 decline, one could speculate it may have been related to a heavy February snowfall with extended period of ground cover. The following is an excerpt from the 2010 Annual Report (Lichliter, K. 2010.): '*Heavy snow in February with prolonged ground cover resulted in meadow voles creating "runways and haystacks" beneath the snow. When the snow melted, predators (mainly hawks) had a 'feast' in the Tuleyries and Kestrel Knob trail sections. During the annual March box inspection and maintenance, many remains of voles and birds were noted on the nest box tops. This phenomenon may have influenced the resultant lowest number of nesting attempts for Eastern Bluebirds on the trail system since 2004*.' The 2010 season remains the lowest number for EABL fledglings to date, at 97.

Although we see fluctuation over the years, note that the trendline indicates steady increase in numbers over time.



Tree Swallow Fledglings per 18-Year Period

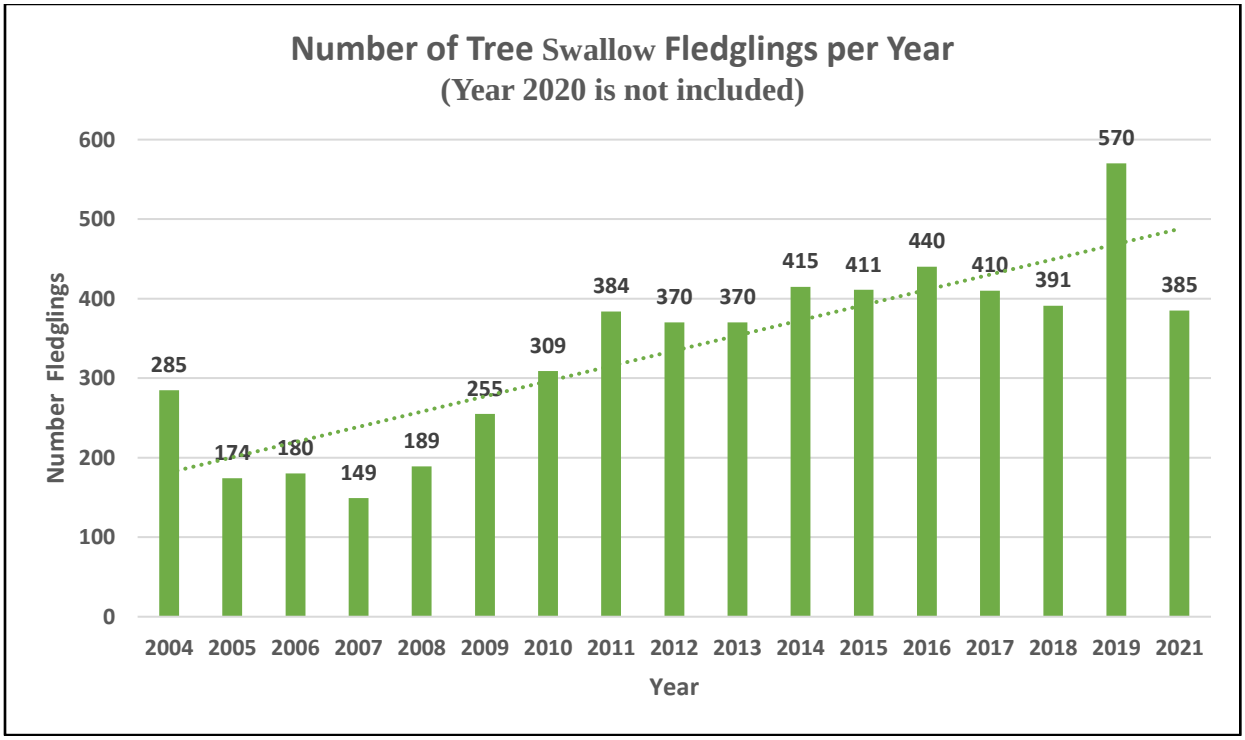
The chart below depicts the number of Tree Swallow fledglings per year for the past 18 years (2020 was not documented). The 2021 season appears to be a typical year with 385 fledglings recorded.

As we note the TRES did not experience a fledgling population boom in 2021, as we observed with the 2021 EABL, we keep in mind EABL and TRES prefer different insects in their diet and display different feeding methods. One could speculate the TRES possibly did not feed on the 17-year Cicada, as the EABL might have done. (EABL are drop-foragers whereas TRES feed on the wing.)

With the TRES fledgling population boom during the 2019 season at an all-time high of 570, I pose questions. What was different in the environment that may have created more successful nesting conditions? Was there something different on the wintering grounds in s. US and/or Central America that proved beneficial? Was migration less stressful?

We did not see a sharp decline in TRES in 2010 from the February snowstorm like we did with the EABL. One could speculate that TRES, as they are migratory, were not in the region at time of snowfall and did not return to the area until well after the melt.

Although we see fluctuation over the years, note that the trendline indicates steady increase in numbers over time.



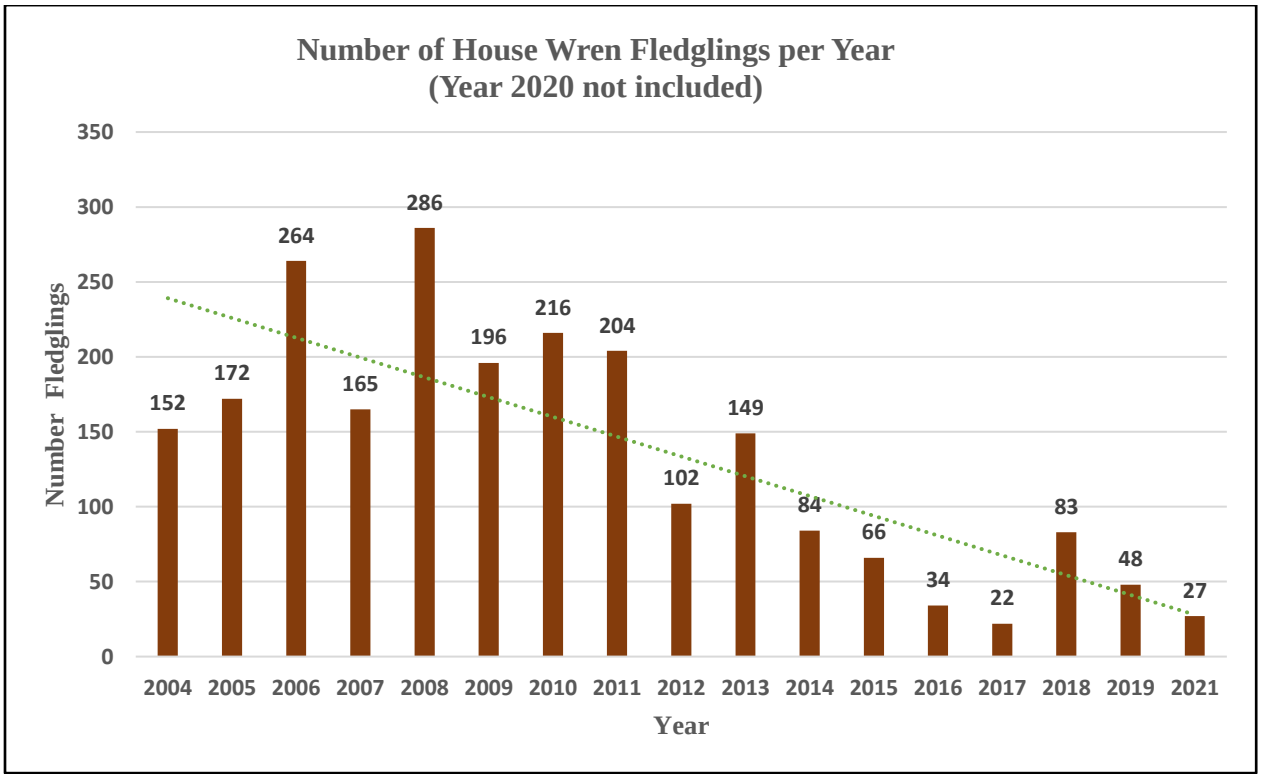
House Wren Fledglings per 18-Year Period

The chart below depicts the number of House Wren fledglings per year for the past 18 years (2020 was not documented).

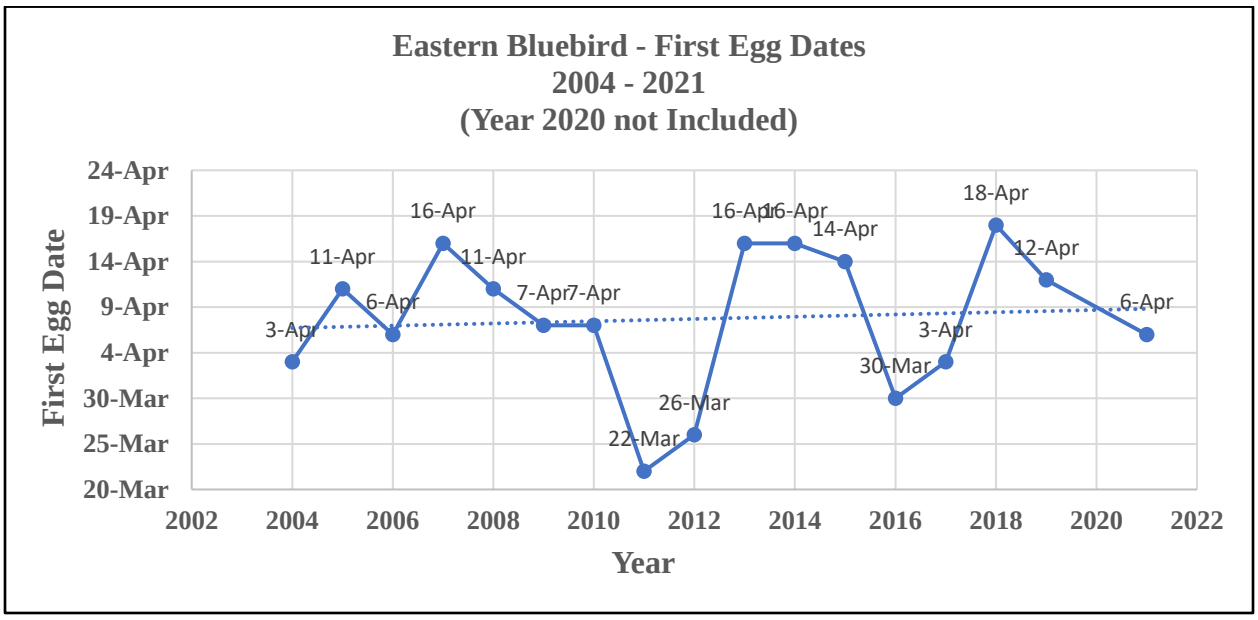
For a species that was so abundant from 2004 to 2011, I am confused and concerned about the reasons for their decline. Year 2018 showed a slight increase from the previous three years; however, the pattern of decline has returned and seems to be continuing.

With the continuing population decline, I pose many questions. Has the trail habitat changed? I have not noted any major clearing of trees or shrubby areas at Blandy, which the HOWR prefer over open land. Did the HOWR depend on something about the Ash trees that have been decimated by the Emerald Ash Bore over the recent years? Did the HOWR depend on a species of insect that lived on the Ash trees? The HOWR are notorious for their high-spirited attitude and destructive little shenanigans for out-competing other species for nesting boxes. Has something changed with the EABL or TRES so they can defend/compete better against the HOWR for the nest site?

On referring to the House Wren Data Table below, of the 6 nesting attempts in 2021, 31 eggs were laid, 4 eggs were lost, 27 eggs hatched and were assumed fledged, resulting in 87% fecundity. Results of next season are anticipated. Will the decline continue, or will we have a rebound?

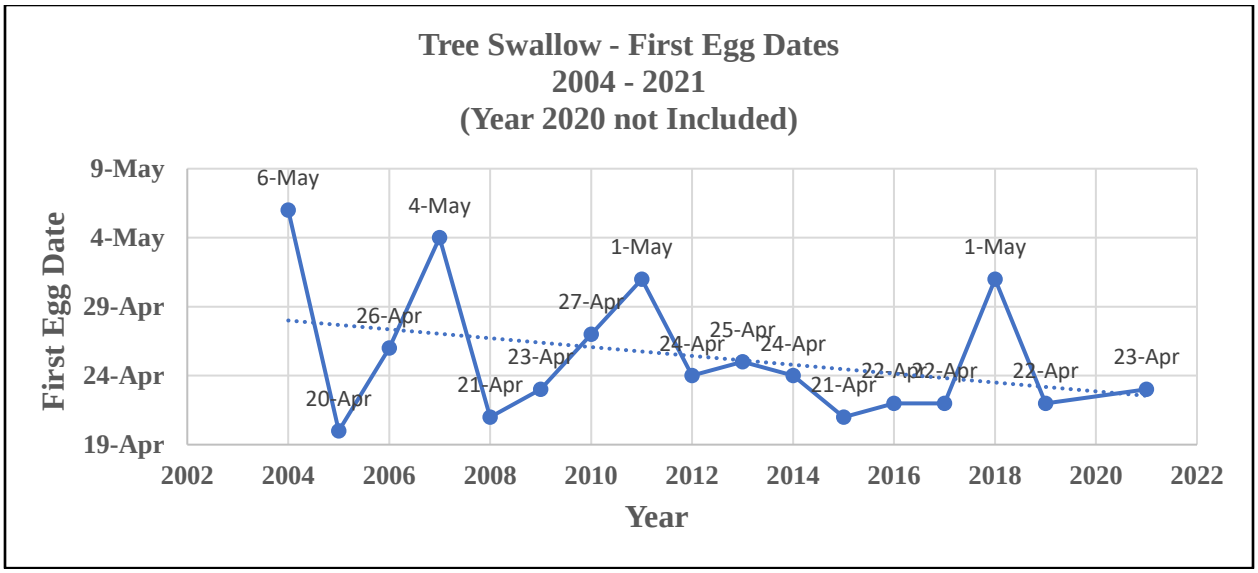


Eastern Bluebird – First Egg Dates



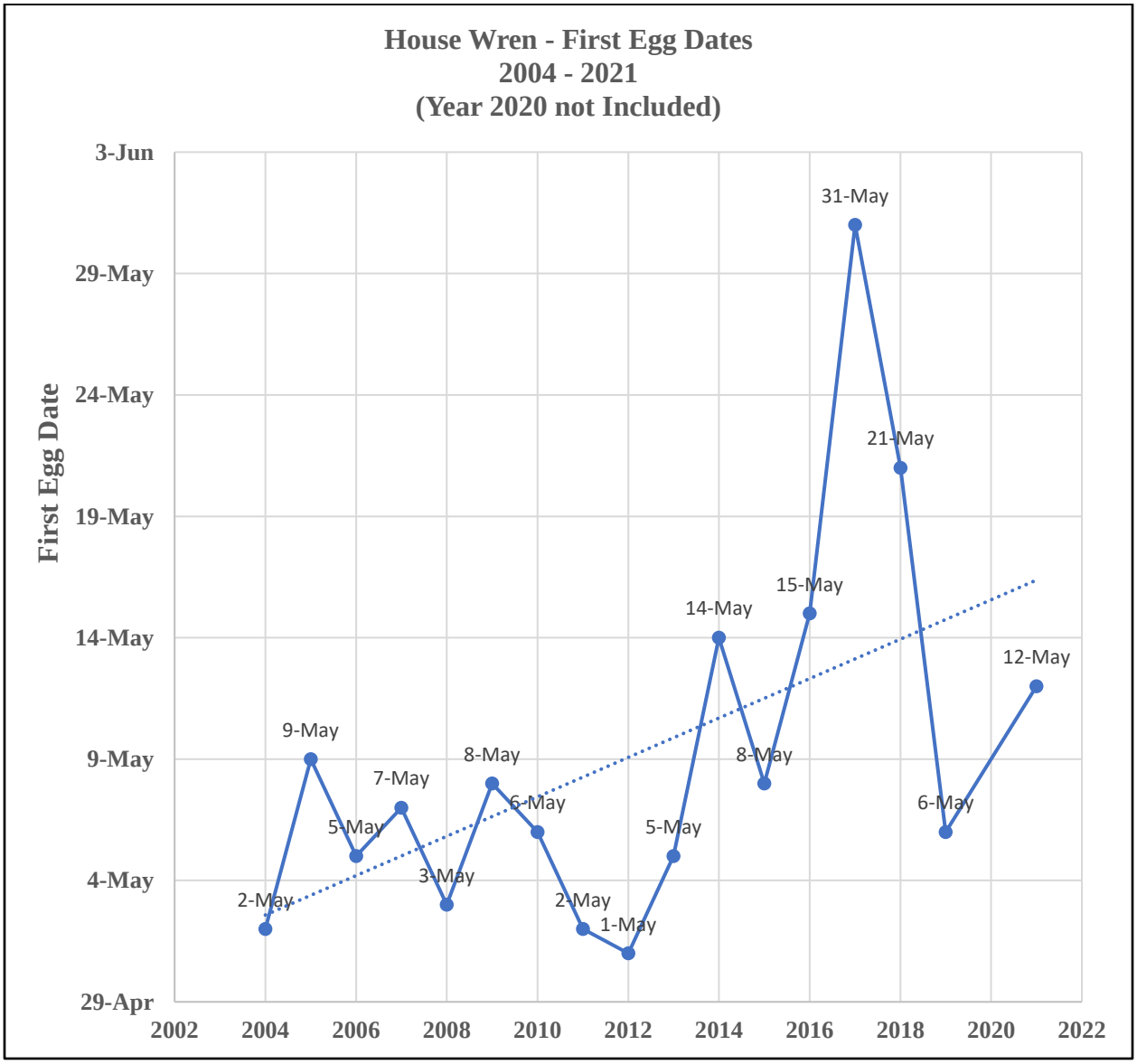
First egg dates recorded for Eastern Bluebirds over the 18-year period were as early as 22 March and as late as 18 April (2020 was not documented). The trend line indicates a steady, but very slight, movement to later first egg dates over the time period.

Tree Swallow – First Egg Dates



First egg dates recorded for Tree Swallows over the 18-year period were as early as 20 April and as late as 6 May (2020 was not documented). The trend line indicates a slight movement to earlier first egg dates over the time period.

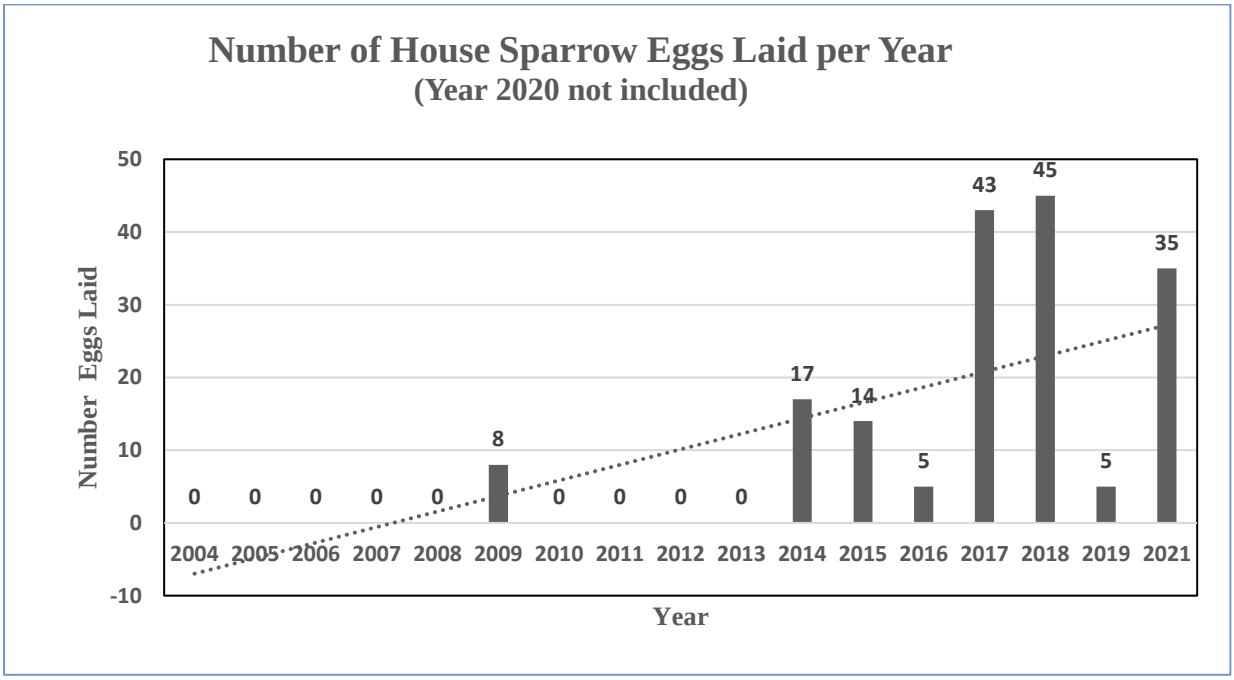
House Wren – First Egg Dates



First egg dates recorded for House Wrens over the 18-year period were as early as 1 May and as late as 31 May (2020 was not documented). The trend line indicates movement toward later first egg dates over the time period.

As noted on the Number of House Wren Fledglings per Year graph (page 4), 2014 was the year we documented the significant drop in number fledglings to a low of 84, with decrease every season since. This drop appears to correlate somewhat with the later first egg dates in all but two years (2015 and 2019) since 2014. I pose the question, as the HOWR is migratory, are they arriving maybe 7 to 10 days later than our prior documented seasons (before 2014)? Or, are our spring temperatures causing delayed nest building and egg laying?

Number of House Sparrow Eggs Laid per Year



The non-native House Sparrow is not protected by Federal law and ornithological organizations, such as Virginia Bluebird Society, encourage reproduction control measures. The Wooden Egg Swap Method is utilized on the trail system for this reason. We had no documented HOSP nesting activity in the nest boxes during the first five years. Our first documented HOSP eggs were in 2009. Box 16 had two broods totaling 8 eggs with first egg dates of 20 May and 30 May; none of these eggs were allowed to hatch. We had no reported HOSP for the next four-year period. Since 2014, we have documented HOSP nesting attempts each year. Total viable eggs swapped with wooden eggs for the 18-year period is 178. If the 178 eggs had survived, and each of the 178 birds then produced 5 new birds, that would be 890 new HOSP. As you can see, they have the ability to multiply quickly.

In the absence of regular monitoring during 2020, and in order to ensure that the nest boxes were not being utilized by the non-native HOSP, the trail manager formed the House Sparrow Patrol Team. A small group of trail technicians volunteered to scout assigned trails to observe and record presence of HOSP. With that information, the trail manager, along with trail technicians Glenny Comer and David Borger, utilized the Wooden Egg Swap Method in attempt to control HOSP productivity. Eight wooden eggs were swapped out for viable HOSP eggs from boxes 29 and 62.

It is imperative that we continue to practice control measures to not only protect our native trail species, but to also protect the native Purple Martins (PUMA) that utilize the Shenandoah Audubon/PUMA Colony near the Lake Arnold area.

New Species to the Trail – The Red-headed Woodpecker

This season presented an unusual and exciting event. On 9 July, 'chew marks' were discovered around the entry holes on two nest boxes by Leah Delong and Dana Crone. On 16 July, two pale pink eggs and wood shavings were discovered by Ursula Sherrill and myself. On 17 July, the box was monitored by David Borger and myself and the eggs were identified as Red-headed Woodpecker (RHWO) eggs; the woodpecker was in the box when the door was opened. For the time period 19 July to 30 July, while the pair tended to their nest, the birds were quietly and discretely observed by David Borger and myself. Unfortunately, on 3 August 2021, a piece of egg shell and a RHWO feather were found on the ground beneath the nest box. The box was opened, the eggs were gone, and sawdust and berries covered the nest box floor. For a detailed account of the nesting attempt of the RHWO, please reference the accompanying document to this report entitled, *"Red-Headed Woodpecker (Melanerpes erythrocephalus) Nests in an Eastern Bluebird (Sialia Sialis) Nest Box on the Shenandoah Audubon/Blandy Bluebird Trail at Blandy Experimental Farm"* (Lichliter, K. 2021).

Nest Boxes and Utilization

The trail system has grown since 2004, at which time we started with 100 boxes. In 2005 the Wrenville Trail section was added to include an additional 10 boxes. In 2014 the Catbird Branch Trail section was added to bring us to the current total, 132 nest boxes. Any statistical analysis should account for these changes.

Year	Number Nest Boxes
2004	100
2005 – 2013	110
2014 – current	132

Empty nest boxes (indicated in our documentation by the code "MT") are those nest boxes that had no nesting attempts made during the season. A 'nesting attempt' is defined as 'at least one egg laid.'

Year	Number Empty Nest Boxes/Total Nest Boxes	Year	Number Empty Boxes/Total Boxes
2004	2/100	**2013**	2/110
2005	3/110	**2014**	4/132
2006	2/110	**2015**	1/132
2007	4/110	**2016**	2/132
2008	2/110	**2017**	4/132
2009	1/110	**2018**	3/132
2010	4/110	**2019**	3/132
2011	2/110	**2020**	-
2012	2/110	**2021**	2/132

A Note about the 2020 Nesting Season

Due to COVID-19 restrictions, Blandy Experimental Farm was closed to the public for much of the 2020 monitoring season. When the Arboretum did reopen in early June, the trail manager determined that, as there was no clear method to predict nesting cycle status in order to avoid premature fledging of nestlings, regular monitoring would not take place for the remainder of the season. Any collected data would undoubtedly have been incomplete. With this in mind, the trail did meet its first objective; to provide habitat.

In September the trail manager conducted an assessment of all 132 nest boxes to evaluate the posts, nest boxes, predator guards, etc. Each box location was given a rating score based on condition of post, nest box, predator guard, mower damage, signage, foliage encroachment, etc. and a system for work detail was organized.

From the results of the assessment, trail technician David Borger built and installed 14 new nest boxes. Trail technician Glenny Comer replaced 30 box roofs. Blandy staff suppled 12 new posts and removed the old posts; David and Glenny then installed the new posts and remounted the nest boxes on those posts. Ted Saunders, past trail technician, and trail manager Kaycee Lichliter, cleared Buckthorn and other invasive species from around the Catbird Branch trail section nest boxes. Chris Lewis, trail technician and trail maintenance chief, repaired hardware cloth and guards.

As part of the assessment, the trail manager identified and documented the last species to utilize each box during the 2020 season; however, it is not clear at this time if this information is noteworthy. Trail manager also cleaned out all old dirty TRES nests, and any other debris in the boxes. All used clean nests were left in place for overwintering birds to utilize as cover.

Data Submission

Data is submitted annually to The University of Virginia's Blandy Experimental Farm, The Virginia Bluebird Society, The Northern Shenandoah Valley Audubon Society, The Cornell Lab of Ornithology's NestWatch (a Citizen Science program) and various other ornithological-related agencies and persons.

For more detailed information, please reference the Data Tables below or contact the trail manager.

Final Words

The Shenandoah Audubon/Blandy Bluebird Trail continues to provide valuable habitat for our native, cavity-nesting birds in a world where habitat is diminishing at an alarming rate. As the trail technicians continue to dedicate their time and energy for the benefit of the birds by participating in this project, each and every one of them should be proud of their contributions and, as I am very grateful to them, I say, "Job well done!"

Eastern Bluebird *(Sialia sialis)* Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2021	6 Apr	117	530	52	13	465	29	436	82.2
2020	-	-	-	-	-	-	-	-	-
2019	12 Apr	80	318	37	11	270	7	263	82.7
2018	18 Apr	68	284	60	18	206	19	187	65.8
2017	3 Apr	72	305	44	16	245	19	226	87.2
2016	30 Mar	85	375	48	9	318	65	253	67.6
2015	14 Apr	81	334	39	13	283	21	262	78.4
2014	16 Apr	75	315	45	7	263	8	255	80.9
2013	16 Apr	68	282	24	17	241	5	236	83.7
2012	26 Mar	78	324	93	22	209	13	196	60.5
2011	22 Mar	49	210	39	5	166	12	154	73.3
2010	7 Apr	31	134	26	5	103	6	97	72.4
2009	7 Apr	72	286	48	-	231	26	205	71.6
2008	11 Apr	80	344	72	-	272	47	225	65.4
2007	16 Apr	89	346	147	-	199	28	171	49.4
2006	6 Apr	69	298	57	-	241	20	221	74.2
2005	11 Apr	52	235	86	-	149	33	116	49.4
2004	3 Apr	43	191	50	-	141	12	129	67.5
18-yr Total		**1206**	**5111**	**967**	**136**	**4002**	**370**	**3632**	

Fecundity (survivorship) = birds fledged/eggs laid x 100

Tree Swallow *(Tachycineta bicolor)* Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2021	23 Apr	105	550	108	16	426	41	385	70.0
2020	-	-	-	-	-	-	-	-	-
2019	22 Apr	139	746	117	24	605	35	570	76.4
2018	1 May	112	572	110	16	446	55	391	68.3
2017	22 Apr	132	655	154	35	466	56	410	63.0
2016	22 Apr	126	633	123	23	487	47	440	70.0
2015	21 Apr	108	536	79	18	438	27	411	76.7
2014	24 Apr	120	593	92	31	470	55	415	70.0
2013	25 Apr	93	487	71	25	391	21	370	76.0
2012	24 Apr	96	503	94	10	399	29	370	73.5
2011	1 May	92	481	80	13	388	4	384	79.8
2010	27 Apr	90	433	90	6	337	28	309	71.4
2009	23 Apr	69	349	64	-	279	24	255	73.1
2008	21 Apr	56	262	65	-	197	8	189	72.1
2007	4 May	55	276	110	-	166	17	149	54.0
2006	26 Apr	54	256	69	-	187	7	180	70.3
2005	20 Apr	79	429	161	-	268	94	174	40.5
2004	6 May	65	346	56	-	290	5	285	82.3
18-yr Total		**1591**	**8107**	**1643**	**217**	**6240**	**553**	**5687**	

Fecundity (survivorship) = birds fledged/eggs laid x 100

House Wren *(Troglodytes aedon)* Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2021	12 May	6	31	4	0	27	0	27	87.0
2020	-	-	-	-	-	-	-	-	-
2019	6 May	12	64	9	6	49	1	48	75.0
2018	21 May	20	101	16	2	83	0	83	82.1
2017	31 May	6	33	6	1	26	4	22	67.0
2016	15 May	12	47	8	4	35	1	34	72.0
2015	8 May	17	84	14	1	69	3	66	78.6
2014	14 May	20	113	24	5	84	0	84	74.3
2013	5 May	30	173	13	8	152	3	149	86.1
2012	1 May	28	151	28	8	115	13	102	67.5
2011	2 May	52	296	65	9	222	18	204	68.9
2010	6 May	56	283	45	6	232	16	216	76.3
2009	8 May	53	267	53	-	209	14	196	73.4
2008	3 May	78	410	86	-	324	38	286	69.8
2007	7 May	72	371	178	-	193	28	165	44.5
2006	5 May	78	440	115	-	325	61	264	60.0
2005	9 May	67	362	122	-	240	68	172	47.5
2004	2 May	51	269	95	-	174	22	152	56.5
18-yr Total		**658**	**3495**	**881**	**50**	**2559**	**290**	**2270**	

Fecundity (survivorship) = birds fledged/eggs laid x 100

Carolina Chickadee – (*Poecile carolinensis)* – Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2021	N/A	0	0	0	0	0	0	0	0
2020	-	-	-	-	-	-	-	-	-
2019	N/A	0	0	0	0	0	0	0	0
2018	N/A	0	0	0	0	0	0	0	0
2017	N/A	0	0	0	0	0	0	0	0
2016	27 Apr	1	6	0	0	6	0	6	100
2015	21 Apr	1	6	0	0	6	0	6	100
2014	26 Apr	1	1	1	0	0	0	0	0
2013	N/A	0	0	0	0	0	0	0	0
2012	6 Apr	1	7	7	0	0	0	0	0
2011	23 Apr	2	13	12	1	0	0	0	0
2010	17 Apr	3	18	4	-	14	0	14	77.8
2009	30 Apr	1	2	2	-	0	0	0	0
2008	29 Apr	1	5	1	-	4	4	0	0
2007	25 Apr	1	5	5	-	0	0	0	0
2006	12 Apr	3	17	14	-	3	3	0	0
2005	22 Apr	2	13	4	-	9	0	9	69.2
2004	2 May	1	1	1	-	0	0	0	0
18-yr Total		**18**	**94**	**51**	**1**	**42**	**7**	**35**	

Fecundity (survivorship) = birds fledged/eggs laid x 100

Red-Headed Woodpecker *(Melanerpes erythrocephalus)* – Data Table
Time Period 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2021	15 July	1	2	2	0	0	0	0	0

Carolina Wren *(Thryothorus ludovicianus)* – Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2019	12 Apr	1	5	5	0	0	0	0	0

Tufted Titmouse – *(Parus bicolor*) - Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2006	20 Apr	1	3	3	0	0	0	0	0

House Sparrow (*Passer domesticus)* Data Table
Time Period 2004 – 2021

Year	First Egg Date	Nesting Attempts	Eggs Laid	Eggs Lost	Unhatched Eggs	Nestlings	Nestlings Lost	Fledged	Fecundity (%)
2021	7 Apr	9	35	35	0	0	0	0	0
2020	N/A	2	8	8	0	0	0	0	0
2019	28 May	1	5	5	-	-	-	-	0
2018	27 Apr	12	45	43	-	2	2	-	0
2017	18 Apr	4	43	43	-	-	-	-	0
2016	7 May	3	5	5	-	-	-	-	0
2015	23 May	2	14	14	-	-	-	-	0
2014	9 May	3	17	17	-	-	-	-	0
2013	-	0	-	-	-	-	-	-	-
2012	-	0	-	-	-	-	-	-	-
2011	-	0	-	-	-	-	-	-	-
2010	-	0	-	-	-	-	-	-	-
2009	20 May	2	8	8	-	-	-	-	0
2008	-	0	-	-	-	-	-	-	-
2007	-	0	-	-	-	-	-	-	-
2006	-	0	-	-	-	-	-	-	-
2005	-	0	-	-	-	-	-	-	-
2004	-	0	-	-	-	-	-	-	-
17-yr totals		**37**	**180**	**178**	**-**	**2**	**2**	**-**	**0**

Additional Project Information

Baruffi, Gregory J. and Kaycee D. Lichliter. 2005. *Northern Shenandoah Valley Audubon Society – Blandy Bluebird Trail – Annual Report, 2005*, under the auspices of NSVAS and Blandy Experimental Farm, Clarke County, Virginia.

Lichliter, Kaycee. 2021. Shenandoah Audubon/Blandy Bluebird Trail 2010 Season Report.

Lichliter, Kaycee. 2021. Red-Headed Woodpecker *(Melanerpes erythrocephalus)* Nests in an Eastern Bluebird *(Sialia Sialis)* Nest Box on the Shenandoah Audubon/Blandy Bluebird Trail at Blandy Experimental Farm.