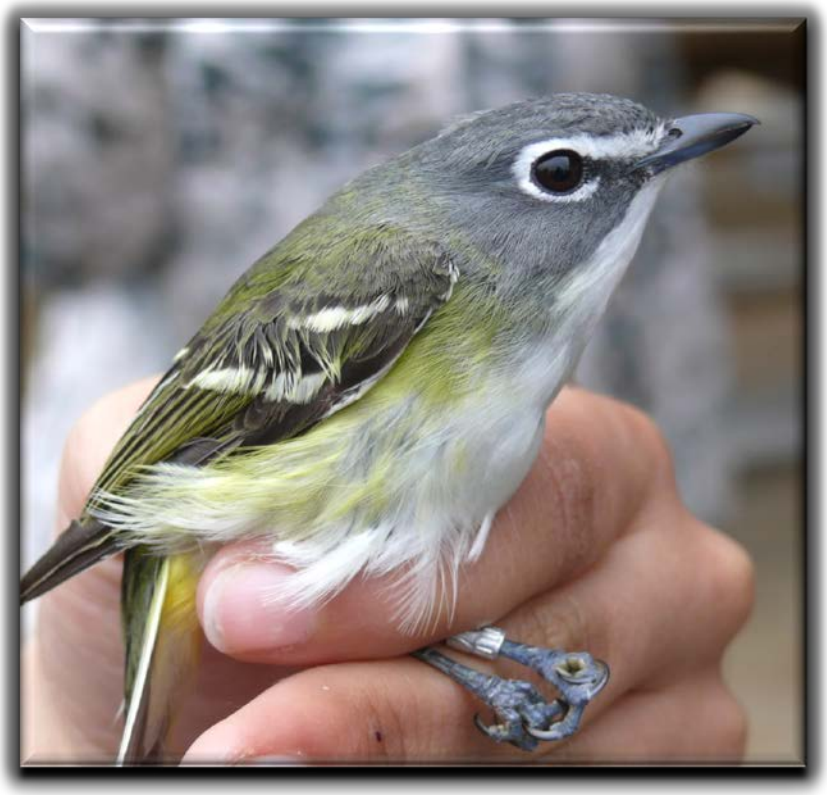
THE ARBORETUM AT PENN STATE



Bird Banding

A Five-Year Summary

2010-2015

Prepared by Nick Kerlin

January 2016

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Cover Photo: Blue-headed Vireo

1. Executive Summary

The Bird Banding Program of The Arboretum at Penn State (University Park Campus), part of the Avian Education Program, was initiated in 2010 on Arboretum lands ¼ and ½ mile northwest of the H.O. Smith Botanic Gardens. Standardization of the program for spring and fall migration monitoring was implemented in the spring of 2011. Three primary goals were established: provide hands-on field experience in bird banding for The Pennsylvania State University (PSU) student and community volunteers, educate the public about bird banding and the resident and migrant birds of central Pennsylvania, and collect data to address scientific questions about birds. This report summarizes results from the first five years (fall 2010-fall 2015) of banding operations at The Arboretum at Penn State.

The Spring Banding Season operates for approximately 16 days each spring (late March through early May). The Fall Migration covers approximately 16 days from early September to the end of October. A total of 3,447 birds of 80 species have been banded since 2010, plus an additional 374 birds handled as recaptures (birds previously banded). While some variation occurs seasonally and annually, the top five species banded are gray catbird, white-throated sparrow, American goldfinch, northern cardinal and song sparrow.

Research is geared toward establishing base line data for local bird populations and extent of area use as a stopover point for migrants. Data collection also is provided to the North American Bird Banding Program of the United States Geological Survey (USGS) Bird Banding Lab.

2. Introduction

2.1 History

Beginning in 2010, then PSU graduate student Emily Thomas ’07, ’09 initiated informal bird banding sessions to provide fellow students with experience in bird banding.

Expansion of the Avian Education Program in 2011 was made possible by an endowment from an anonymous donor. This enabled the annual availability of funds for banding equipment purchase/replacement, printing and other program support needs. In the spring of 2011 standards and protocols were established to provide continuity.

2.2 Objectives

- Provide hands-on field experience in bird banding for The Pennsylvania State University (PSU) student and community volunteers
- Educate the public about bird banding and the resident and migrant birds of central Pennsylvania
- Collect data to address scientific questions about birds

3. Management

3.1 Supervision

Currently 16 university and community volunteers serve as members on an Avian Education Committee whose role is to provide input on the role and management of avian education at the Arboretum. Bird banding is one component of this program. Margaret Brittingham, professor of wildlife resources, Department of Ecosystem Science and Management, College of Agricultural Sciences, presently serves as committee chair and supervisor of the bird banding program. Nick Kerlin, community volunteer and licensed bird bander, is the bander-in-charge responsible for banding operations, data submissions and supervision of bird banding volunteers.

3.2 Funding

In 2011 an endowment was provided by an anonymous donor. This secured continued funding (approximately $8,000 per year) for bird banding equipment purchase and replacement as well as other needs of the Avian Education Program.

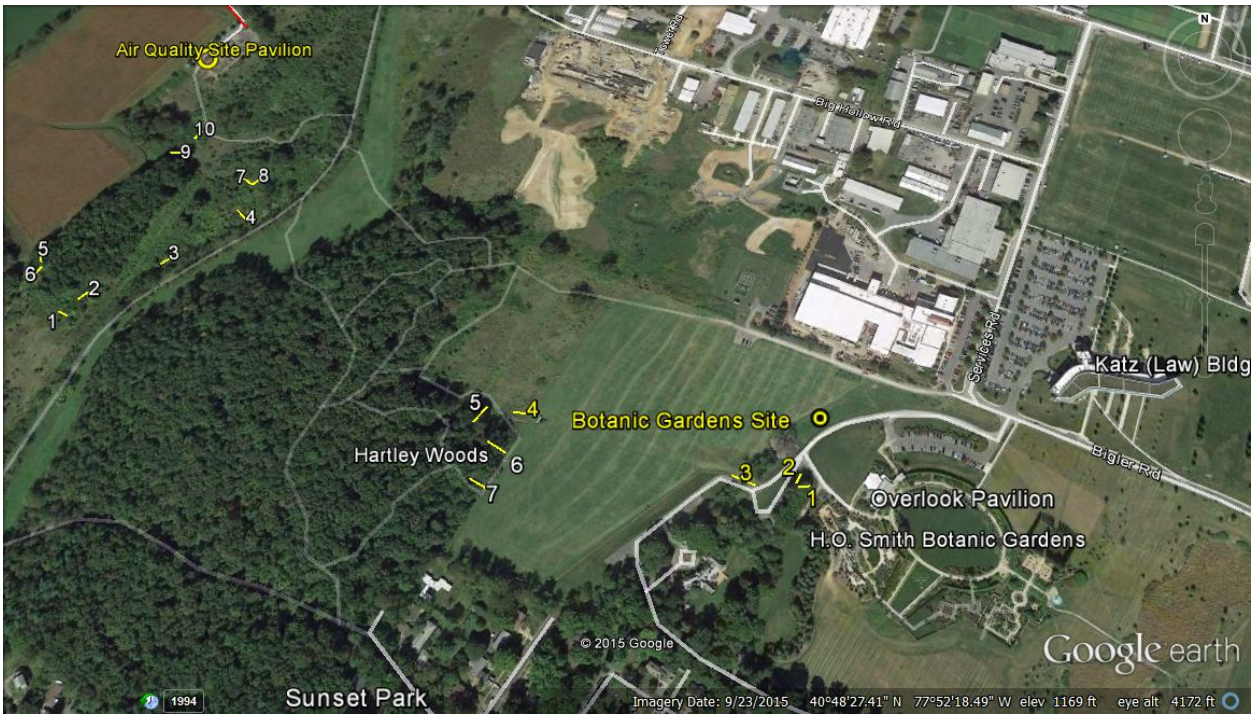
4. Operations

4.1 Banding Locations

The Air Quality site, which serves as the primary banding area, is located adjacent to the Bellefonte Central Rail Trail in Big Hollow, approximately 0.5 mile northwest of the H.O. Smith Botanic Gardens. Banding headquarters utilized the permanent pavilion located at the site (40 °48’39.34”N and 77 ° 52’ 38.25”W). A total of ten mist nets (12-meter length each) are used (nets #9 and #10 were added in 2012). The area consists of former pasture lands populated primarily with invasive shrub species (privet, autumn olive, multi-flora rose) adjacent to crop land and small woodlots of predominately mature white oak.

The Botanic Gardens site functions as the secondary banding location. Banding occurs here on a limited number of days in the fall season (Saturdays only). It has the benefits of being more public accessible and visible. Banding is limited at this site however due to net access distance, logistical problems and suitable habitat availability.

The site is located along the northeastern edge of Hartley Wood, just northwest of the Overlook Pavilion. Five 12-meter nets are placed along the wood edge with an additional net set (two 6 meter nets set in a “V”) at the feeders located 60 yards west of the Overlook Pavilion at the H.O. Smith Botanic Gardens. Habitat is forest edge of brush growth, primarily invasive privet with pokeweed and thistle, adjacent to mowed grass fields used for football weekend parking. Banding headquarters (40 °48’24.53” N and 77 °52’11.02”) utilized a portable canopy tent erected along the service road just north of the Overlook Pavilion.



Banding Sites and Net Locations

4.2 Site Management

Only minimal clearing for trail access to nets and within net lanes has been performed. Annual maintenance is completed in late March (removal of winter debris), again in late August (mowing of grass/forbs within net lanes) and daily as needed.

4.3 Procedures

Once birds are extracted from mist nets they are taken to a centralized location (picnic pavilion at the Air Quality site or a tent canopy near the Overlook Pavilion of the Botanic Gardens) for processing. New birds are identified as to species, age and sex. Measurements are taken of wing chords and tail length, weight and visible fat. Net location from which the bird was caught also is recorded. A federally numbered band is attached to each bird and then it is released. The banding data is later copied to BANDIT (the computer program provided to banders by the USGS Bird Banding Lab) and submitted electronically to the Bird Banding Lab. The same data is also saved to a computer spreadsheet maintained by the bander-in-charge.

Extracting Birds from Net

Recaptures are checked for their existing band number and recorded for location, net number and date. Birds then are released immediately.

5. Results

From the fall of 2010 through the fall of 2015, a total of 3,791 birds of 80 different species have been handled at the two banding sites. This includes 3,447 newly banded birds and recapture of 374 individuals. The average number of birds caught daily (4 hours of banding) in the spring season is 19 and in the fall is 31.

Species composition and numbers will continue to change over time as vegetation type, height and food availability changes. Most species caught during the years of this summary report are typical of advanced brushy old field habitat.

A list of all species and numbers banded can be found in Appendix B. A listing and ranking of banded Conservation Need Species is found in Appendix A.

5.1 Species and Numbers

Top to Bottom, Left to Right: gray catbird, white-throated sparrow, American goldfinch, northern cardinal, song sparrow

Top 5 Banded Species		
Species	**# of Birds**	**% of Total Birds Banded**
Gray Catbird	871	25%
White-throated Sparrow	630	18%
American Goldfinch	213	6%
Northern Cardinal	178	5%
Song Sparrow	161	4%
TOTAL	**2053**	**58%**

5.1.1 Habitat Usage

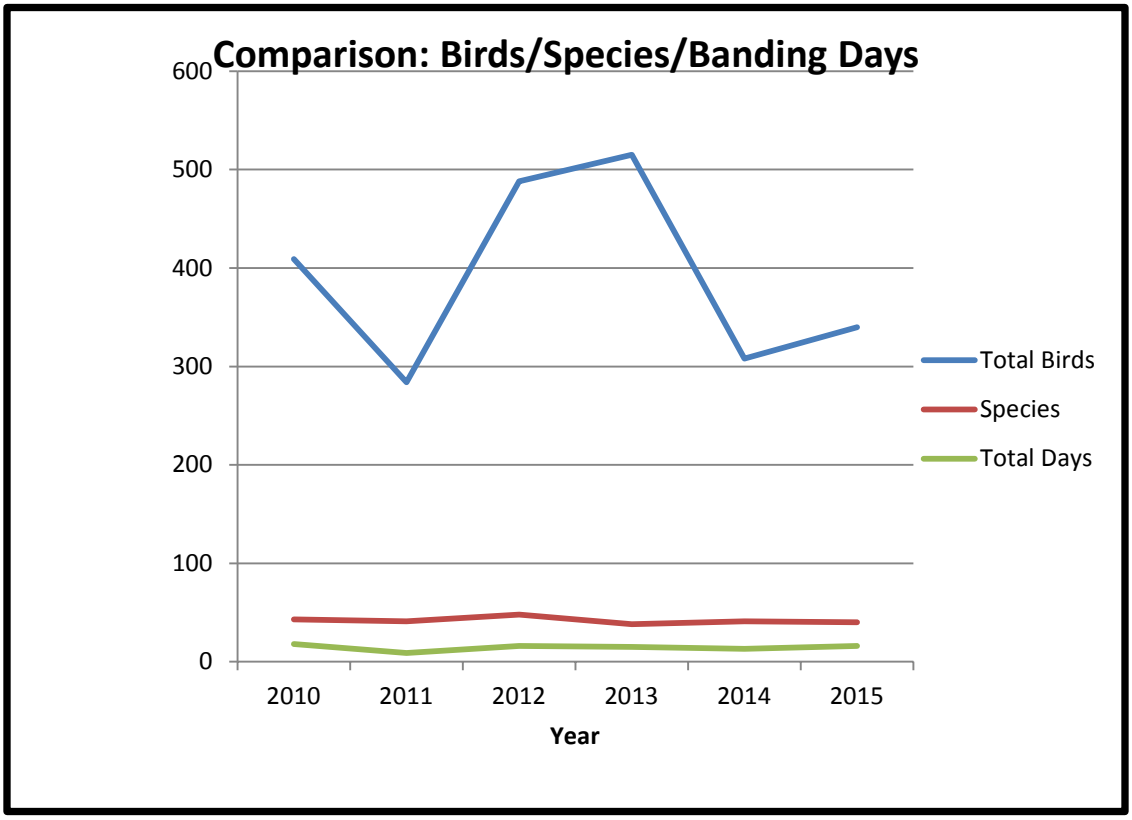
Bird numbers and species composition seem to indicate the importance of the Air Quality site as a migration stopover point. Dense shrub cover seems to be the main attraction with desired food availability to a much lesser degree. The dominant vegetative type is invasive common privet, whose fruit yields carbohydrates, but few lipids (fat) the latter which birds need to produce body fat as fuel for migration. Banding and on-site observation indicates that fruit-eating birds (robin, catbird, cedar waxwing, et al.) utilize privet berries last (late winter, spring). A high of 41 cedar

waxwings were banded in spring of 2014, attracted by the abundance of privet berries which they are able to digestively assimilate faster than other bird species.

Such stopover migration points have become an important research focus in the last few years nationwide. Most of the work has focused on major migration concentration points i.e, along the coast, waterways, etc. “Interior” sites are just now beginning to receive banding coverage data of such important areas.

5.1.2 Capture Rates

While species composition and number of banding days/year have remained nearly the same, the following graph shows the fluctuation in total numbers that have occurred.



Comparison Over Time

Why are the species composition and numbers not higher? Capture rates at the Arboretum are based upon a variety of reasons that differ when compared to other banding stations.

- Absence of a water source (pond or stream).
  Water and its associated vegetation serve as a “bird magnet,” attracting a higher variety of species and numbers.

- Low number of nets utilized
  Most eastern US banding stations operate 20 to 60 nets at one time compared to only ten at the Arboretum.

- Little variety of habitat
  Greater variety provides a higher degree of cover and food sources.

- Limited number of banding days and hours/day
  Most other banding stations open earlier and close later on a daily and seasonal basis.

- Weather conditions
  All banding stations have to contend with weather changes on a daily basis. Weather fronts or lack thereof may cause migrants to arrive, remain or overfly the banding sites.

Despite such limitations, extrapolation of data indicates the number of birds handled in the Arboretum banding program compares favorably with other eastern United States interior banding stations.

5.2 Recaptures

Recaptures are those birds previously banded at either of the two Arboretum sites and recaptured at a future date. Birds recaptured on the same day they were banded are not included in the recapture totals. Total recaptures were 374, a recapture rate of 10% of the total number of "birds handled" (new banded and recaptured).

Year	Season	# Birds
2010	fall	0
2011	spring	16
	fall	12
2012	spring	36
	fall	36
2013	spring	59
	fall	42
2014	spring	40
	fall	35
2015	spring	56
	fall	42
TOTAL		**374**

Recaptures per season

5.2.1 Encounters

As defined by the USGS Bird Banding Lab an Encounter is "Any handling of a banded bird, alive or dead. In terms of the BBL database, it is the report of a band subsequent to the initial banding." Two birds have been found outside the immediate area of banding:

- Eastern Towhee banded 9/27/12 was found dead (cause unknown) on 1/26/2013 in Statesboro, GA. Distance from Air Quality banding site is approximately 635 miles.

- Northern Cardinal banded 9/20/2012 was found dead (apparent window strike) on 1/9/2013 west of State College near Science Park Road in Centre County, PA. Distance is approximately three miles from the Air Quality banding site.

5.2.2 Longest Lived Recaptures

These are birds banded at the Arboretum sites and subsequently recaptured in a future year.

Species	**Banded**	**Recaptured**	**Age in Yrs.**
Blue Jay	9/3/2010	4/25/2015	4.5+
Gray Catbird	9/5/2010	5/8/2015	4.5+
American Robin	4/9/2011	4/27/2015	4
Northern Cardinal	10/18/2011	10/22/2015	4

5. 3 Net Productivity

Eight nets were utilized 2010-2011. Two additional nets (# 9 and # 10) were added in 2012. Numbers below are based on 10 seasons of banding.

<u>Most Productive Nets (new birds) 2011-2015</u>

All these nets are located at the western end of the banding area, along a wood edge/field where two hedgerows merge and account for 39% of all birds banded

Net # 5– Capture of 348 birds which is 15% of total. Five seasons as most productive net.

Net # 6 – Capture of 287 birds which is 12% of total. Three seasons as most productive net.

Net # 1 – Capture of 280 birds which is 12% of total. Six seasons as most productive net.

Least Productive Nets (new birds) 2011-2015

These nets are located in more “interior” locations, virtually surrounded by brushy vegetation of 12 feet or more in height.

Net # 2 - Capture of 117 birds which is 5% of total. Nine seasons as least productive net.

Net # 4 - Capture of 173 birds which is 7% of total. Seven seasons as least productive net.

Net # 3 - Capture of 184 birds which is 8% of total. Eight seasons as least productive net.

All net locations have had good days and bad (highest numbers, lowest numbers) and one or more seasons as highest capture rate. This seems to indicate “being in the right place at right time” when migrating feeding flocks are moving through the area. As banding occurs at the most three mornings a week, this can vary daily, hourly and be influenced by local weather conditions. Daily capture rates have varied from a single individual to a high of 74 birds.

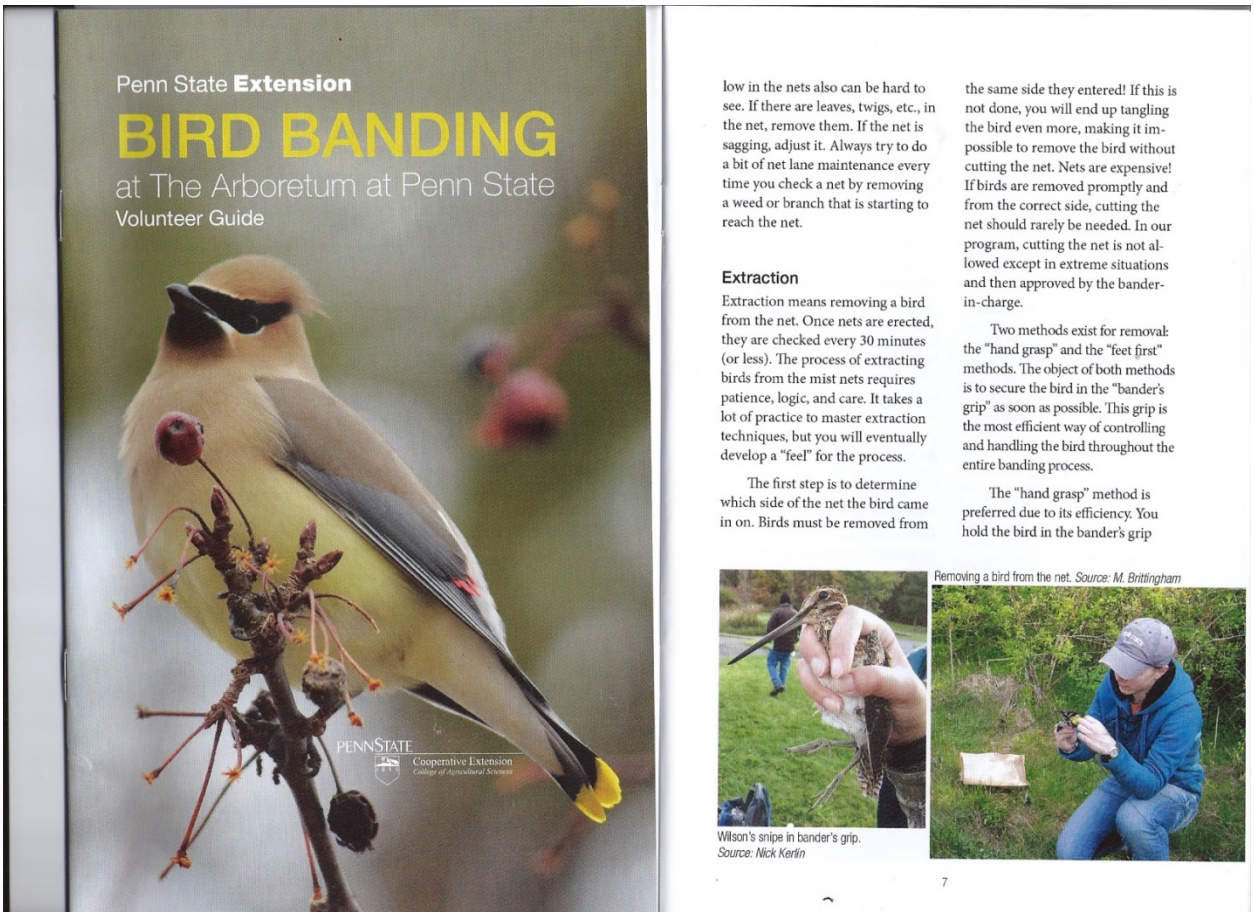
6. Publications and Data Submission

Beginning with the fall of 2011 information on banding efforts for the spring and fall seasons has been submitted yearly for inclusion in the “Atlantic Flyway Review” section of *North American Bird Bander*.

Daily summaries of banding activities were posted on the local State College Bird Club listserv.

All data is forwarded to the United States Geological Survey (USGS) Bird Banding Laboratory and the Pennsylvania Game Commission as per banding permit requirements. This data is combined with that of other banding stations nationwide and made available to researchers.

“Bird Banding at the Arboretum at Penn State – Volunteer Guide” a 33 page guide (prepared by Jill Koren, Elora Grahame, Jackson Martini, Nick Kerlin and Margaret Brittingham) was published in the fall of 2015 by Penn State Extension and made available to banding volunteers. The booklet covers banding program objectives, protocol, and procedures.



Volunteer Guide

7. Other Projects

7.1 Nelson's Sharp-tailed Sparrow

A single morning of banding at Colyer Lake, Potter Township, Centre County, PA in October of 2013 was conducted to determine if migrating Nelson's sparrows were present. The effort resulted in the capture of two Nelson's sparrows. This provided evidence that the species was utilizing the drawdown vegetated area of the lake.

Additionally, numerous visual sightings of this species were reported on state-wide and local birding electronic mailing lists.

Banding was repeated in the same area in 2014 on two days in October with an increased number of capture nets. Despite these increases, no Nelson's were captured or sighted. Electronic mailing lists also reported far fewer birds of this species sighted throughout the state.
(Species and numbers of birds handled are not included in the charts of birds processed in this report.)

7.2 Bumblebee Study

Banding operations participated in a study on bumble bee predation by birds by the Department of Entomology of the University of Illinois at Urbana-Champaign. Fecal samples from 115 birds of 24 species were collected during the 2014 spring and fall banding seasons and forwarded to the University of Illinois for analysis. The Arboretum sampling was one of 26 banding stations across the country involved in the study.

7.3 Pine Siskins

As the result of an influx of pine siskins, a single morning of banding occurred on Feb. 11, 2015 at Shaver's Creek Environmental Center, Barree Twp., Huntingdon County, PA. A total of 26 birds of four species were banded, which included 12 pine siskins. (Species and numbers of birds handled at this location are not included in the charts of birds processed in this report.)

8. Visitors

Since the beginning of banding, visitors have been welcomed during banding operations, either as drop-ins or by previous reservations. Over 1200 people have visited the banding sites since 2010. These have included individuals, family groups, scouts, K-12 school groups, university classes and senior citizen groups. Reserved groups are presented with a 45 minute presentation that includes history of banding, why we band, equipment used and participant observation of on-going banding operations. Experienced volunteers who are present on days of visitation conduct various aspects of the presentation.

9. Volunteers

Student and community volunteers make the banding program possible. Volunteer participation in the banding program provides students with hands-on field experience they otherwise would not experience. It allows community volunteers to participate in citizen science research.

9.1 Bander-in-Training Program

In the fall of 2012, a Bander- in-Training Program was initiated to attract volunteers and provide basic instruction on bird banding techniques and procedures. Three other sessions have been conducted since this time. This non-credit, no-fee program involves two hours of in-class training on why we band, tools of the trade, species identification, purpose of the banding program and other topics. Hands-on practice includes use of measuring equipment for wing chord, tail length and weight. Participants are asked to volunteer a minimum of three days to the banding effort. Each session has had 12-15 participates. Of these, an average of 3-6 choose to stay with the program in coming years. This has been shown to be an adequate number to replace those lost from student graduation each year. Some students have used their experience to gain

seasonal employment at other banding station locations across the country. A few community volunteers have assisted with banding for several years.

9.2 Volunteer Participation

The chart to the right summarizes the yearly totals of volunteer hours. As many of the people have volunteered for more than one season, the actual total of specific individuals is 110. Of these, 47 people have given four days or more of their time amounting to 43% of total volunteer hours.

Volunteers banding sharp-shinned hawk

Volunteer and Hours		
Year	**Volunteers**	**Vol. Hours**
2010	?	?
2011 Spring	11	176
Fall	10	250
2012 Spring	28	292
Fall	30	497
2013 Spring	24	435
Fall	29	667
2014 Spring	19	382
Fall	24	364
2015 Spring	19	335
Fall	28	453
TOTALS	**222**	**3851**

10. References

Health and Fitness Consequences of Using Non-Native Dominated Habitats During Migratory Stopover , The BULA News, Winter 2013, Burke Lake Banding Station, Michigan State University.

Kerlin, Nick, *Bird Banding- The Arboretum at Penn State,* seasonal reports for 2010 to 2015, The Arboretum at Penn State.

Kerlin, Nick, *Nelson's Sparrow Banding Project, Colyer Lake, Potter Township, Centre County, PA,* internal report, 2014, The Arboretum at Penn State.

PA State Wildlife Action Plan 2015-2025, pub. Oct.1, 2015, PA Game Commission, PA Fish and Boat Commission.

Shieldcastle, Mark, *Migrational Movements and Habitat Usage of Passerines in the Great Lakes Region and Specifically the Ottawa National Wildlife Refuge, Ohio Progress Report-2004 BSBO-ONWR04-1,* Black Swamp Bird Observatory.

Addendum:

Bumble Bee Study
https://www.ideals.illinois.edu/bitstream/handle/2142/88090/MADDUX-THESIS-2015.pdf?sequence=1
Added 2/2016

Appendix A Banded Conservation Need Species

The following table lists those species banded at The Arboretum at Penn State 2010-2015 that are listed in the Species of Greatest Conservation Need Prioritizations section of the *Pennsylvania State Wildlife Action Plan 2015-2025*.

Global Conservation Rank (G); 1 critically imperiled, 2 imperiled, 3 vulnerable, 4 apparently secure, 5 secure
State Conservation Rank (S); 1 critically imperiled, 2 imperiled, 3 vulnerable, 4 apparently secure, 5 secure
Priority Scores for Species of Greatest Conservation Need in Pennsylvania (2015-2025), by Prioritization Category: 1= top priority, 6 = lowest priority.
Species scoring a 1, 2, or 3 in any category are the highest priorities for focused conservation action.
Pennsylvania Responsibility Species
Category 1: Contribute to the conservation of globally or regionally important species
Category 2: Prevent common species from becoming at risk.
Category 3: Maintain rare native species.
Category 4: Reduce knowledge gaps to better assess conservation status of species.
B = breeding, M =migrant

Common Name	**Global/State Rank**	**Category 1**	**Category 2**	**Category 3**	**Category 4**
Sharp-shinned Hawk-B	G5S3	4	2	4	6
Sharp-shinned Hawk-M	G5S5M	6	5	6	6
Yellow-bellied Flycatcher	G5S1	4	6	2	6
Willow Flycatcher	G5S4	4	1	5	6
Brown Creeper	G5S4	4	1	5	6
Swainson's Thrush	G5S3	4	1	4	6
Wood Thrush-B	G5S4	4	1	5	6
Wood Thrush-M	G5S4M	6	3	5	6
Gray Catbird	G5S5	6	4	5	5
Northern Waterthrush	G5S2	5	6	4	6
Blue-winged Warbler	G5S4	4	1	5	6
Black & White Warbler	G5S4	4	1	5	6
Nashville Warbler	G5S3	4	1	3	5
Hooded Warbler-M	G5S4M	6	2	4	5
Blackpoll Warbler	G5S1	4	5	2	6
Black-throated Blue Warbler	G5S4	4	1	5	6
Black-throated Green Warbler	G5S3	4	1	4	6
Canada Warbler	G5S4	4	1	4	5
Yellow-breasted Chat	G5S2	4	5	3	6
Eastern Towhee-M	G5S4M	6	3	5	6
Field Sparrow	G5S3	4	1	4	6
White-throated Sparrow	G5S3	4	2	4	6

Appendix B

Bird Totals (New Bandings) 2010-2015

Species Top 5 individuals/season highlighted in yellow	**Fall 2010 8/27-11/12**	**Spring 2011 4/25-5/25**	**Fall 2011 9/10-10/19**	**Spring 2012 3/26-5/9**	**Fall 2012 9/9-10/26**	**Spring 2013 3/28-5/7**	**Fall 2013 9/10-10/25**	**Spring 2014 4/1-5/6**	**Fall 2014 9/6-10/16**	**Spring 2015 4/1-5/8**	**Fall 2015 9/3-10/22**	**Total all Years**	Average Individuals per Season	Top 5 All Time
Sharp-Shinned Hawk	0	0	0	0	0	0	0	0	0	0	1	1	0.09	
Mourning Dove	0	0	1	0	1	0	1	2	0	1	0	6	0.55	
Yellow-billed Cuckoo	0	0	2	0	0	0	0	0	0	0	0	2	0.18	
Black-billed Cuckoo	0	0	0	0	1	0	0	0	0	0	0	1	0.09	
Red-bellied Woodpecker	0	0	0	0	0	0	0	0	0	0	2	2	0.18	
Downy Woodpecker	0	0	1	0	4	0	6	0	1	0	3	15	1.36	
Northern Flicker	0	0	0	0	0	1	0	3	2	2	4	12	0.67	
Yellow-bellied Flycatcher	1	0	0	0	5	0	4	0	1	0	0	11	1.00	
Acadian Flycatcher	0	0	1	0	0	0	0	0	0	0	0	1	0.09	
“Trail's Flycatcher” (Alder/Willow)	1	2	0	0	0	0	0	0	0	2	3	8	0.73	
Willow Flycatcher	0	0	0	1	1	0	0	0	0	0	0	2	0.18	
Least Flycatcher	4	0	1	0	5	0	0	2	2	0	1	15	1.36	
Eastern Phoebe	3	0	3	0	2	0	4	1	1	1	2	17	1.55	
Blue-headed Vireo	0	0	1	1	5	1	2	0	1	0	5	16	1.45	
Warbling Vireo	1	0	0	0	0	0	0	0	0	0	0	1	0.09	
Red-eyed Vireo	1	1	3	1	7	0	2	0	1	0	0	16	1.45	
Blue Jay	6	0	4	4	6	8	5	3	4	0	6	46	4.18	
Black-capped Chickadee	11	5	4	0	9	7	9	1	2	2	5	55	5.00	
Tufted Titmouse	4	0	3	1	8	0	4	0	6	3	13	42	2.90	
White-breasted Nuthatch	0	0	2	0	0	0	1	0	0	0	3	6	0.55	
Brown Creeper	0	0	0	1	1	1	0	0	0	0	0	3	0.27	

Species Top 5 individuals/season highlighted in yellow	Fall 2010 8/27-11/12	Spring 2011 4/25-5/25	Fall 2011 9/10-10/19	Spring 2012 3/26-5/9	Fall 2012 9/9-10/26	Spring 2013 3/28-5/7	Fall 2013 9/10-10/25	Spring 2014 4/1-5/6	Fall 2014 9/6-10/16	Spring 2015 4/1-5/8	Fall 2015 9/3-10/22	**Total all Years**	Average Individuals per Season	Top 5 All Time
House Wren	7	0	0	0	0	0	0	0	0	0	0	7	0.64	
Winter Wren	1	0	0	0	0	0	0	0	0	0	0	1	0.09	
Carolina Wren	2	1	1	1	3	0	4	0	3	2	0	17	1.67	
Golden-crowned Kinglet	0	0	0	0	2	2	1	0	0	0	0	5	0.45	
Ruby Crowned Kinglet	8	6	7	3	10	12	12	9	3	15	2	87	7.91	
Eastern. Bluebird	0	0	0	0	0	1	0	0	0	1	0	2	0.18	
Veery	0	0	0	0	2	0	0	0	0	1	0	3	0.27	
Gray-cheeked Thrush	1	0	0	0	1	0	0	0	0	0	1	3	0.27	
Swainson's Thrush	2	0	4	0	2	0	2	0	3	0	7	20	1.82	
Hermit Thrush	1	4	2	6	2	8	1	8	2	19	1	54	4.91	
Wood Thrush	1	0	0	4	1	3	4	1	4	3	7	28	2.55	
American Robin	0	10	2	23	0	26	1	30	0	6	1	99	9.00	
Gray Catbird	117	32	102	60	68	3	148	15	129	53	144	871	79.18	**1**
Brown Thrasher	2	2	1	2	5	8	4	12	8	9	7	60	5.45	
Northern Mockingbird	4	0	0	1	3	3	0	0	0	1	1	13	1.18	
Cedar Waxwing	3	0	0	0	0	14	2	90	0	6	2	117	12.11	
Ovenbird	6	0	3	0	4	0	3	0	7	1	7	31	2.56	
Worm-eating Warbler	2	0	0	1	0	0	1	0	1	0	1	6	0.55	
Northern Waterthrush	1	0	0	1	0	0	0	2	0	0	0	4	0.36	
Blue-winged Warbler	0	0	0	1	0	1	0	0	0	0	0	2	0.18	
Black & White Warbler	0	0	0	0	0	0	1	1	2	0	2	6	0.55	
Tennessee Warbler.	0	0	0	0	0	0	0	0	1	0	1	2	0.10	
Orange-crowned Warbler	0	0	1	0	0	0	0	0	0	0	0	1	0.09	

Species Top 5 individuals/season highlighted in yellow	Fall 2010 8/27-11/12	Spring 2011 4/25-5/25	Fall 2011 9/10-10/19	Spring 2012 3/26-5/9	Fall 2012 9/9-10/26	Spring 2013 3/28-5/7	Fall 2013 9/10-10/25	Spring 2014 4/1-5/6	Fall 2014 9/6-10/16	Spring 2015 4/1-5/8	Fall 2015 9/3-10/22	**Total all Years**	Average Individuals per Season	Top 5 All Time
Nashville Warbler	1	0	1	0	1	0	0	0	1	1	0	5	0.45	
Connecticut Warbler	0	0	1	0	0	0	1	0	0	0	0	2	0.18	
Mourning Warbler	0	0	1	0	1	0	1	0	3	0	1	7	0.64	
Common Yellowthroat	11	5	2	3	1	0	5	1	4	0	1	33	3.00	
Hooded Warbler	0	0	0	0	1	0	2	0	4	0	0	7	0.64	
American Redstart	0	0	1	0	2	0	1	0	9	0	0	13	1.18	
Magnolia Warbler	9	1	9	2	8	0	9	0	19	0	6	63	5.73	
Yellow Warbler	0	1	0	0	0	0	0	1	0	0	0	2	0.18	
Chestnut-sided Warbler	0	0	1	0	0	0	1	0	1	1	0	4	0.36	
Blackpoll Warbler	2	0	0	0	1	0	1	0	1	0	1	6	0.55	
Black-throated Blue Warbler	0	0	0	0	1	0	0	0	0	0	0	1	0.09	
Palm (western) Warbler	0	0	1	0	0	0	0	0	0	0	0	1	0.09	
Yellow-rumped Warbler	1	0	6	0	0	0	0	1	0	1	0	9	0.82	
Black-throated Green Warbler	0	0	0	0	1	0	0	0	1	0	0	2	0.18	
Canada Warbler	0	0	0	0	1	0	0	0	0	1	1	3	0.20	
Wilson's Warbler.	1	0	1	2	1	0	0	0	1	0	1	7	0.64	
Yellow-breasted Chat	1	0	0	0	0	0	0	0	0	0	0	1	0.09	
Eastern Towhee	7	6	8	4	24	3	16	8	13	3	12	104	9.89	
Chipping Sparrow	0	0	0	0	0	0	0	1	1	0	4	6	0.55	
Field Sparrow	1	7	1	0	4	5	0	4	0	6	0	28	2.55	
Fox Sparrow	0	0	0	1	0	8	0	2	0	2	0	13	1.22	
Song Sparrow	26	2	17	16	19	21	26	11	5	9	9	161	14.64	**5**
Lincoln's Sparrow	2	0	0	0	0	0	2	0	2	0	0	6	0.55	

Species Top 5 individuals/season highlighted in yellow	**Fall 2010 8/27-11/12**	**Spring 2011 4/25-5/25**	**Fall 2011 9/10-10/19**	**Spring 2012 3/26-5/9**	**Fall 2012 9/9-10/26**	**Spring 2013 3/28-5/7**	**Fall 2013 9/10-10/25**	**Spring 2014 4/1-5/6**	**Fall 2014 9/6-10/16**	**Spring 2015 4/1-5/8**	**Fall 2015 9/3-10/22**	**Total all Years**	Average Individuals per Season	Top 5 All Time
Swamp Sparrow	5	1	2	2	2	2	0	1	0	4	0	19	1.67	
White-throated Sparrow	70	18	28	42	99	78	168	26	31	25	45	630	62.22	**2**
White-crowned Sparrow	0	0	1	1	2	0	1	0	1	0	0	6	0.55	
Dark-eyed Junco	3	0	0	0	2	10	0	4	0	6	0	25	2.27	
Northern Cardinal	16	10	16	11	32	10	27	15	10	15	16	178	16.33	**4**
Rose-breasted Grosbeak	5	0	1	0	3	0	0	0	4	0	1	14	1.27	
Indigo Bunting	0	0	4	0	0	0	0	0	0	0	0	4	0.36	
Red-winged Blackbird	0	0	0	0	0	2	0	0	0	0	0	2	0.18	
Common Grackle	0	0	0	1	0	0	0	0	0	0	0	1	0.09	
Brown-headed Cowbird	0	1	0	1	0	2	0	3	0	1	0	8	0.73	
Baltimore Oriole	0	2	0	0	0	0	0	0	0	4	0	6	0.22	
House Finch	30	0	10	0	55	0	7	0	11	0	9	122	11.09	
Purple Finch	6	0	0	0	11	0	0	0	1	0	0	18	1.80	
American Goldfinch	23	8	34	17	58	9	25	17	1	20	1	213	19.36	**3**
Total Individuals/Season	**410**	**125**	**295**	**215**	**488**	**249**	**515**	**275**	**308**	**227**	**340**	**3447** total all years	**313.36** average birds per season	
Total Species/Season	**43**	**21**	**42**	**30**	**48**	**27**	**38**	**29**	**41**	**33**	**40**		35.73	
Banding Days/Season	**18**	**7**	**9**	**12**	**16**	**14**	**15**	**13**	**13**	**15**	**16**		13.45	
Avg. Birds/Day/Season	**23**	**18**	**33**	**18**	**31**	**18**	**34**	**21**	**24**	**15**	**24**		23.55	
	Fall 2010 8/27-11/12	**Spring 2011 4/25-5/25**	**Fall 2011 9/10-10/19**	**Spring 2012 3/26-5/9**	**Fall 2012 9/9-10/26**	**Spring 2013 3/28-5/7**	**Fall 2013 9/10-10/25**	**Spring 2014 4/1-5/6**	**Fall 2014 9/6-10/16**	**Spring 2015 4/1-5/8**	**Fall 2015**	**Total all Years**		