



**Pennsylvania Department of Transportation
Voluntary Prelisting Pollinator
Conservation Program
2019 Annual Report**

APRIL 2020





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Introduction

This is the 2019 Annual Report for the Pennsylvania Department of Transportation (PennDOT) Voluntary Prelisting Pollinator Conservation Program. The program is a voluntary, non-regulatory, pro-active conservation endeavor pursued with the intent of preventing pollinator species of special concern from requiring federal protection under the Endangered Species Act (ESA). The pro-active sentiment of conserving species in advance of regulatory needs is a shared objective also communicated within the [2015-2025 Pennsylvania Wildlife Action Plan](#) which addresses these terrestrial invertebrate species regardless of the absence of an identified state regulatory agency for their protection.

The program is developed as a living document with associated updates and resources accessible to the public at [2019 PennDOT Voluntary Prelisting Pollinator Conservation Program](#). The program was developed in conjunction with the interagency and stakeholder PennDOT Pollinator Work Group¹ who will continue to review and advise on program changes.

The Federal Highway Administration (FHWA), the lead federal agency for transportation actions in Pennsylvania, has encouraged the development of and fully supports the program. If federal protection under the ESA is determined warranted for species identified in the program and a species is listed as federally threatened or endangered, the program provides for offsetting credits that may be utilized by the FHWA and PennDOT in ESA consultations to mitigate the effects of transportation actions. The program was developed in accordance with USFWS *Policy Regarding Voluntary Pre-Listing Conservation Actions*, [Fish and Wildlife Service Manual at Part 735 \(5/31/2018\)](#). PennDOT administers the program and self-certifies available credits with review and oversight of the PennDOT Pollinator Work Group¹.

PennDOT proposed and established goals for voluntary pollinator conservation efforts on rural road miles focused on three principal approaches that within PennDOT's overall programs held the greatest potential for increasing habitat for the monarch butterfly and pollinator habitat in general:

1. Increased implementation of conservation mowing seasons and methods;
2. Continued implementation of daylighting rural routes to promote milkweed and nectar producing plant growth; and
3. Implementation of planted pollinator sites through PennDOT, PennDOT partners and Adopt and Beautify groups.

Progress in achieving these conservation measures is reported for 2019. Also, where the analysis of the 2019 efforts provides evidence for adjusting future goals and approaches, adaptive management modifications to the program are documented in this report.

¹ A technical advisory board.



PennDOT Pollinator Work Group 2019/2020 Active Members

| | |
|--------------------------|--|
| Darren Altemose | PennDOT Engineering District 6-0 |
| Drew Ames ² | PennDOT Bureau of Project Delivery |
| Raymond Boronyak | PennDOT Engineering District 5-0 |
| James Cessna | PennDOT Engineering District 8-0 |
| Sarah Cordek | PennDOT Bureau of Project Delivery |
| Lucas Crawford | PennDOT Bureau of Maintenance and Operations |
| Jonathan Crum | Federal Highway Administration |
| Joseph Demko | PennDOT Bureau of Maintenance and Operations |
| Andrea Ebur | Federal Highway Administration |
| Christina Grozinger | Pennsylvania State University, Center for Pollinator Research |
| Michael Heitzenrater | PennDOT Engineering District 2-0 |
| Steve Hichens | PennDOT Bureau of Project Delivery |
| Joseph Hovis | Pennsylvania Project Wingspan Coordinator |
| Jeffrey Jodon | Pennsylvania State University, PennDOT Roadside Project |
| Jennifer Kagel | United States Fish and Wildlife Service, Pennsylvania Field Office |
| Autumn Kelley | PennDOT Engineering District 1-0 |
| Betsy Leppo | Western Pennsylvania Conservancy |
| Trilby Libhart | Pennsylvania Department of Agriculture |
| Dr. Carolyn Mahan | Pennsylvania State University, ROW Wildlife Research |
| Victoria Pocius | Pennsylvania State University, Center for Pollinator Research |
| Megan Pulver | Pennsylvania Department of Conservation and Natural Resources |
| Nicole Ranalli | United States Fish and Wildlife Service, Pennsylvania Field Office |
| Michael Retterer | Pheasants Forever, Ohio Pollinator Initiative, Project Wingspan |
| Karen Roccasecca | Pennsylvania Department of Agriculture |
| Bryon Ruhl | PennDOT Bureau of Project Delivery |
| Constance Schmotzer | PSU Extension, Master Gardeners |
| James Spatz | PennDOT Bureau of Project Delivery |
| Hannah Stout | PSU Contract Entomologist |
| Ryan Succheralli | PennDOT Engineering District 10-0 |
| Carl Wesneski | PennDOT Bureau of Maintenance and Operations |
| Cyrille Whitson | Gannet Fleming, Inc. |
| Cheryl Wimer | PennDOT Engineering District 1-0 |
| Thomas Yocum | PennDOT Engineering District 9-0 |
| Toni Zawisa ² | PennDOT Bureau of Project Delivery |

² PennDOT Pollinator Work Group Coordinator



2019 Accomplishments

A summary of accomplishments that occurred during 2019 for the voluntary prelisting pollinator conservation program was presented at the PennDOT Pollinator Work Group at their March 19, 2020 meeting with opportunity for input and discussion. The following are the notable accomplishments that occurred during the 2019 calendar year.

- The PennDOT Pollinator Work Group met on April 10 and July 30, 2019 to provide technical expertise and oversight for the program.
- PennDOT submitted daylighting data to USFWS through the Monarch Conservation Database (MCD) for use in the listing decision
- Pollinator Habitat Establishment was initiated on three pilot Adopt & Beautify/Keystone Pollinator Habitat (A&B/KPH) sites.
- A few additional A&B Groups submitted applications for development of pollinator habitats.
- In November 2019, the final revisions to the Voluntary Prelisting Program were completed and the program was acknowledged by USFWS.
- Research funding was secured for the following research tasks that will be completed by the Pennsylvania State University between 2020-2022:
 1. Review and test pollinator habitat assessment protocols at ten sites.

Three rapid assessment protocols will be tested resulting in a recommendation of a protocol that can best be applied by PennDOT staff, Adopt & Beautify or citizen scientist volunteers. The three protocols for testing are in use in other states.

 - The NCHRP Roadside Monarch Habitat Evaluator
 - Ohio DOT (ODOT) Pollinator Program Scorecard; and
 - Rights-of-Way as Habitat Working Group Pollinator Habitat Scorecard
 2. Assess and describe flowering plant species richness and pollinator habitat at daylit and non-daylit sites in central and northwestern Pennsylvania.

This second component of the study will involve the study of thirty pairs of daylit versus uncut control sites. Some lepidoptera and bee voucher specimens will be taken during the study.
 3. Educational materials for A&B/KPH participants.

The third component of the research will be led by the PSU Extension, Master Gardener Program with the assistance of Larry Weaner, a nationwide expert in meadow development and subject author. Education materials, including two “how to” webinars on planting pollinator bed and meadow habitats, will be compiled, developed and shared through the PennDOT Adopt & Beautify webpage.



- An evaluation of PennDOT mowing practices was completed. Policy revisions to Publication 113, including a new conservation mowing protocol, were published and launched in March 2020. A related revision to Publication 23 will occur in 2020. At PennDOT District discretion, the conservation mowing will be performed before May 1 or between June 20 and July 10 or after October 1 yearly, or alternating years in interchanges and along the right shoulder of roadway beyond the clear zone and extending to mow or ROW limits to control woody vegetation, prevent the growth and spread of prohibited weeds and other undesirable plant growth, and for the purpose of maintaining early succession (meadow) pollinator habitats. Mow height for conservation mowing will be the greatest height safely attainable with the mowing equipment available, at least 5" (10"-12" is preferred if achievable within mowing equipment safety guidelines including assuring that mowing guards are maintained to eliminate risks of injury to persons from flying debris).
- Education materials, including a roadside planting guide, were drafted for the A&B/KPH Program. Publication of the planting guide is expected in 2020.
- An updated A&B/KPH application form was drafted. Publication of the revised form is expected in 2020.
- The [A&B/KPH Program webpage](#) was revised to provide additional guidance.
- A concurrent effort to evaluate and revise PennDOT Seed Mixes was initiated with a focus on native species. A pollinator mix(es) will be added to PennDOT's approved seed mixes.



2019 Credit Reporting

The Voluntary Prelisting Pollinator Conservation Program for PennDOT estimated and established an offsetting pollinator credit goal based on implementation of three principal conservation approaches. These measures hold the greatest potential for increasing habitat in PennDOT ROW for the monarch butterfly, but also provide benefit for other pollinator species, including the yellow banded bumblebee, regal fritillary and frosted elfin. Actual achieved credits have been calculated for 2019 and are compared to the prior established goal. Offsetting credits may be utilized for future projects and PennDOT maintenance and operation actions that effect these pollinator species if they become listed under the ESA. The conservation efforts utilized for accrual of credits are:

1. Implementation of conservation mowing;
2. Daylighting rural routes to promote milkweed and nectar producing plant growth; and
3. Implementation of planted pollinator sites by PennDOT, PennDOT partners and A&B/KPH volunteer groups.

Table 1. 2019 program goals (original estimates)

| Conservation Actions | 2019 Goals | |
|---|--------------|----------------------|
| | acres | credits ¹ |
| reduced mowing or increased conservation mowing ² | 4,108 | 381,428 |
| daylighting | 1,000 | 42,850 |
| planted sites | 22 | 943 |
| TOTAL annual beneficial acres | 5,130 | |
| Credits gained for year | | 425,221 |
| 10% Net Benefit Set Aside | | 42,522 |
| Annual Credits minus Set Aside | | 382,699 |
| Annual Effects ³ | | 371,250 |
| 2019 CREDITS AFTER OFFSETTING ANNUAL EFFECTS ⁴ | | 11,449 |
| ACCRUED CREDITS (Includes accrued credits from 2017-2018) | | 277,887 |
| ACCRUED SET ASIDE (Includes accrued set aside from 2017-2018) | | 154,626 |
| Monitoring requirement for credit approval ⁵ | 87 | |

¹ credits = # milkweed stems above baseline or prior condition

² 2019 goal was half the average of reduced & conservation mowing achieved in 2016-2018

³ avg 2019-2022 TIP effect of 23,250 + annual mowing effect of 348,000 used as a constant

⁴ monarch and yellow banded bumble bee credits; frosted elfin and regal fritillary credits due to host plant availability are not considered

⁵ monitoring goals for 2019 were based on 2016-2018 daylighting; monitoring of planted acres occurs in the year following establishment



Reporting Methods

CONSERVATION MOWING

PennDOT documents in-house and some contract mowing through payroll records entered by its counties. Since the entry of contract mowing is not all inclusive, the results of the conservation mowing analysis err conservatively. In other words, more conservation mowing may have occurred than we are reporting.

All the mowing data was retrieved utilizing our Maintenance IQ system. The PennDOT maintenance code XXX-7711-02 (Mowing - Mechanized) - Completed was utilized as this is the assembly code that represents our ROW mowing operations. A filter was used to capture only payroll records for the 2019 calendar year. Duplicate records, inherent in the manner daily payroll is reported, were removed. Records other than before May 1, between June 20 and July 10 or after October 1 and records for any ROW mowed more than once during the calendar year were removed as these do not meet the conservation mowing requirements. Since the ROW along our rural 4-digit state routes is narrow, frequently 20' wide, it was assumed that any mowing on these routes was clear zone mowing and all these records were also removed from further analysis.

The remaining records for analysis were interstates, other state highways and two-lane state routes with 3-digit designations. Each record contains the length of the segment mowed. To estimate the conservation mowing, a 40' mow width (beyond clear zone) was applied to calculate square feet of mowing which was then converted to acres. Acres of mowing was totaled by county and for all counties combined. The sums by county provided an ability to observe which counties performed the greatest or least amounts of conservation mowing.

Credits are defined as numbers of milkweed stems resulting from conservation measures. To calculate credits a multiplier of 57.15, the conservation measure multiplier derived by Thogmartin, et. al. (2017) was applied to generate credit totals.

DAYLIGHTING

PennDOT also documents in-house and some contract daylighting through payroll records entered by its counties. Since the entry of contract daylighting is not all inclusive, the results of the conservation mowing analysis err conservatively. In other words, more daylighting resulting in pollinator conservation benefits may have occurred than we are reporting.

All the daylighting data was retrieved utilizing our Maintenance IQ system. The PennDOT maintenance code XXX-7715-02 (Brush & Select Tree Thin, Trim & Removal - Mechanized) - Completed was utilized as this is the assembly code that represents our daylighting operations. A filter was used to capture only payroll records for the 2019 calendar year.



Duplicate records, inherent in the manner daily payroll is reported, were removed.

To assure that only the most extensive tree trimming and removal projects that result in the most extensive potential for pollinator conservation benefits through the opening of the canopy were utilized in the analysis, all records for less than 10 segment miles (linear miles) were removed. This adds an additional degree of erring conservatively in the analysis. Segment miles were converted to square miles through the application of a 20' daylighting width, appropriate for the daylighting operations which occur more frequently on rural routes with narrow ROW. The square miles were then converted to acres and credits were calculated utilizing the same 57.15 multiplier (Thogmartin, 2017) as was applied for the conservation mowing analysis.

HABITAT IMPLEMENTATION

Data on habitat implementation was collected in coordination with the PennDOT District Roadside Specialists. Since the Keystone Pollinator Program (KPH) is a very recent addition to PennDOT's Adopt and Beautify (A&B) Program, the 2019 reporting includes only three pilot sites that were initiated during 2018 and 2019.



Results

Table 2. 2019 Actual Conservation Credits Achieved

| Conservation Actions | 2019 Actual | |
|--|--------------------|----------------------|
| | acres ¹ | credits ² |
| reduced mowing or increased conservation mowing | 11,029 | 630,307 |
| daylighting | 5,951 | 340,100 |
| planted sites | 1 | 57 |
| annual beneficial acres | 16,981 | |
| Credits gained for year | | 970,464 |
| 10% Net Benefit Set Aside | | 97,046 |
| Annual Credits - Set Aside | | 861,034 |
| Annual Effects ³ | | 371,250 |
| CREDITS AFTER OFFSETTING ANNUAL EFFECTS ⁴ | | 489,784 |
| ACRUED CREDITS (Includes accrued credits from 2017-2018) | | 756,222 |
| ACRUED SET ASIDE (Includes accrued set aside from 2017-2018) | | 209,151 |
| Monitoring completed ⁵ | 25 ⁶ | |

¹ Only Conservation mowing reported - mowed once either before May1, between June 20-July10 or after October 1 only reported; daylighting reported when greater than 10 linear miles (24.24 acres) of cutting occurred.

² credits = # milkweed stems above baseline or prior condition

³ avg 2019-2022 TIP effect of 23,250 + annual mowing effect of 348,000 used as a constant

⁴ monarch and yellow banded bumble bee credits; frosted elfin and regal fritillary credits due to host plant availability are not considered

⁵ monitoring goals for 2019 had been based on 2016-2018 daylighting; monitoring of planted acres occurs in the year following establishment; actual varies because funding for daylighting research was not ready for 2019 implementation.

⁶ Wingspan Habitat evaluations sites, plus 3 sites pilot planting sites with initial site prep underway

CONSERVATION MOWING

The analysis of the 2019 data reveals that significantly more mowing, 11,029 acres, meeting the conservation mow parameters occurred than the previously established goal of 4,108 acres. This results in a significant increase in pre-listing credits and is a positive result for the overall conservation program. What is not clear, is whether this positive result of additional acres of conservation mowing is accidental or driven in any way by increased awareness of pollinator conservation because of increased awareness within PennDOT. During 2018 and 2019, messaging of the importance of pollinator conservation and opportunity to reduce mowing costs did occur. However, it is suspected that the increase in conservation mowing in 2019 is likely accidental and a result of other variables such as weather.

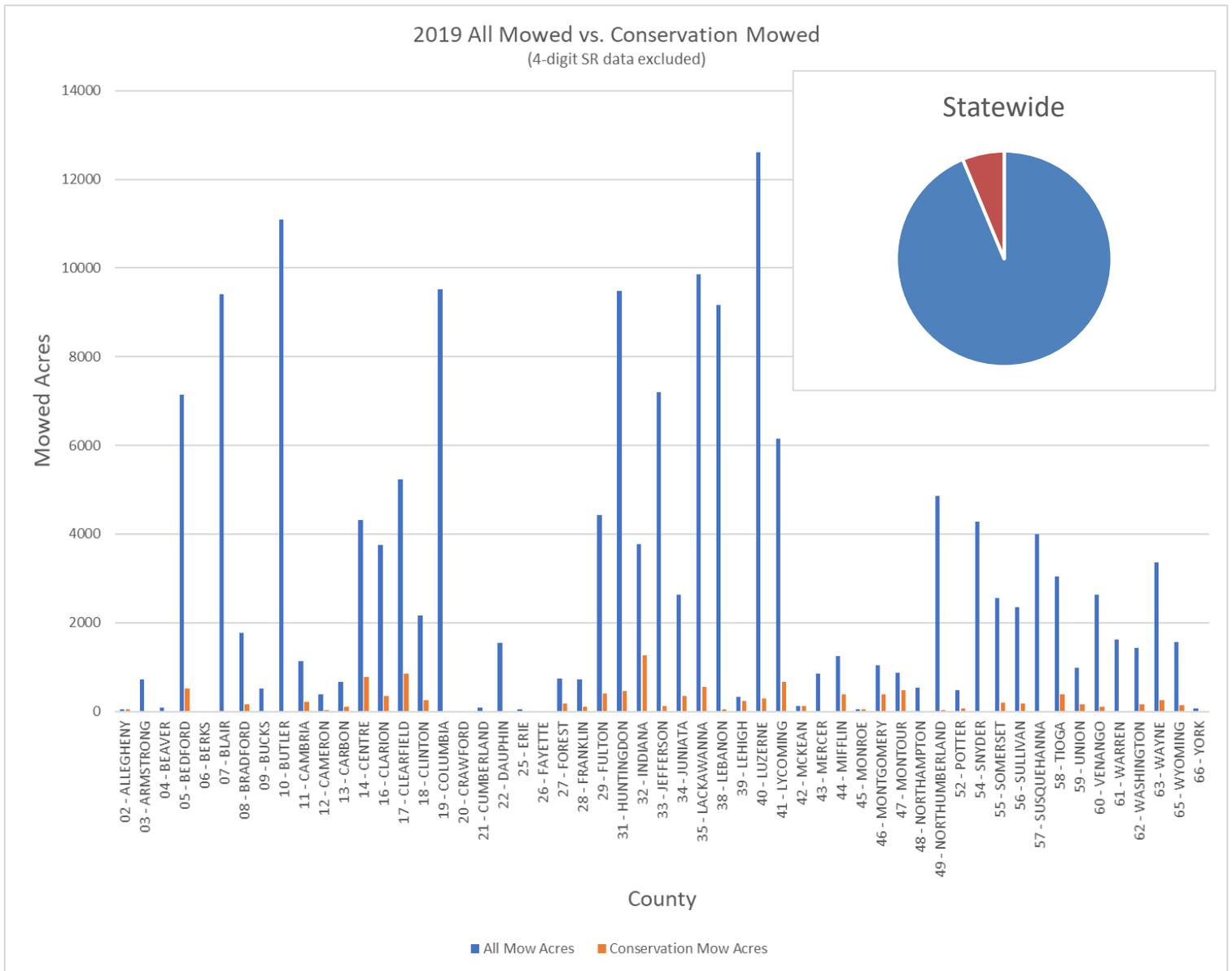


The 2019 mowing season was completed before policy changes to mowing practices to add a conservation mowing maintenance assembly were developed and published. It is important to note that absent a specific conservation mow assembly for reporting practices, clear zone mowing and mowing in areas where conservation mowing will be targeted in the future are lumped together. To minimize the inclusion of clear zone mowing, all data related to mowing on narrow 4-digit state route (SR) ROW were eliminated from the analysis. Absent a conservation mowing protocol and policy, the timing and frequency of mowing is driven by several variables including weather conditions, equipment and staff availability, and contract notices to proceed. Additionally, in the current reporting process, contract mowing payroll is not a required reporting parameter, resulting in an under reporting of contract mowing. In some counties where all mowing is conducted by contractors and reporting was not pursued no data was available, however, it is likely mowing did occur. Greene county is one example of this. The conservation mowing policy and protocol changes published in early 2020 incorporates requirements that should improve reporting and will separate all the clear zone mowing from conservation mowing.

An analysis of the mowing results by county, revealed that in some counties little conservation mowing occurred due to considerable mowing frequency. In some cases, the frequency of mowing was observed as being monthly. Two to three mows annually were typical. In many instances, the timing of mowing fell out of the conservation mow dates by days. Because of mowing frequency and timing, the percentage of conservation mowing versus all mowing is very low overall (Figure 1). This data analysis, because of data reporting challenges, cannot be utilized to compare county effectiveness in achieving conservation mowing but rather provides only general evidence of how significant the opportunity to increase conservation mowing is overall.



Figure 1.





DAYLIGHTING

The analysis of the 2019 daylighting data reveals that more daylighting, 5,951 acres occurred as compared to the program goal of 1,000 acres. The amount of daylighting pursued annually tends to be a function of availability of budgets. This results in a significant increase in pre-listing credits and is a positive result for the overall conservation program.

HABITAT IMPLEMENTATION

The development of pollinator habitat during 2019 was predominantly focused on the establishment of three pilot sites. Mike Retterer, Pheasants Forever, provided and continues to provide technical assistance for these efforts as needed. A job sheet procedure for establishing pollinator meadows was developed as part of this effort.

- a) Huntingdon County Maintenance Facility Site. The Huntingdon County Maintenance site has applied two applications of herbicide and seeded with annual seed. Perennial seeding is scheduled for the spring of 2020. The planted pollinator habitat area is approximately one acre.
- b) The City of Lock Haven Adopt & Beautify site at SR 120 and East Walnut Street in the City of Lock Haven. Removal of a few landscape trees and the fall application of herbicide were completed. Additional herbicide applications and seeding with annuals is planned for 2020. Perennial seeding would occur either as dormant seeding in the winter of 2020/2021 or during the spring of 2021. The potential pollinator habitat area is approximately three acres.
- c) Erie County I-79 McKean to I-90 Interchange. This site is located at the I-79/I-90 Interchange. PennDOT District 1-0 is pursuing this site through a construction contract that incorporated the Pheasants Forever job sheet and site plan. The initial herbicide treatment occurred in the fall of 2019. An additional herbicide treatment is planned for the 2021 season. Cheryl Wimer, the District Roadside Specialist is providing on-site construction monitoring for the effort. Public exposure is significant at this Interchange. The potential pollinator habitat area is approximately six acres.

Beyond the three pilot sites, because of PennDOT press, media and messaging, new Adopt & Beautify (A&B) groups expressed interest and additional sites are in the initial coordination and application steps. Presentations at the annual statewide Pheasants Forever (PF) meeting have resulted in two PF chapters actively pursuing sites in Allegheny and Erie Counties. An existing A&B group revised their site to add milkweed and other pollinator resource plant species. Early in 2020, the Southwest Pennsylvania Audubon Chapter initiated pursuit of a National Fish and Wildlife Foundation (NFWF) grant to advance the development of 100 acres of pollinator habitat in the ROW of multiple partners. PennDOT is one of these partners with a commitment to provide access to 50 acres of ROW and additional in-kind match for this grant application.



Monitoring

The monitoring goal for 2019 had been established at 87 acres. Twenty-five acres were monitored in 2019. Ten of these acres represent the pilot planting sites. These were monitored by observation only during establishment activities. An additional 15 acres at 15 sites were monitored utilizing the ODOT scorecard as part of evaluation for consideration as Project Wingspan habitat sites for future seed resources and technical assistance through the [NFWF Project Wingspan grant](#).

It had been anticipated, during initial program development that research funding would have been secured and field studies to verify the effectiveness of daylighting as a pollinator conservation measure would have been underway during the 2019 field season. Delays in securing the funding resulted in these anticipated field monitoring activities not occurring in 2019. In addition, the field testing of monitoring protocols was similarly to be funded through research monies and therefore also did not occur during the 2019 season. This field testing of the rapid assessment scorecard protocols is now funded and scheduled to occur in the 2020 field season. The daylighting field activities will occur during the 2021 field season. It should be noted, that at the time of this writing, 2020 field monitoring may be delayed or cancelled because of the COVID19 crisis.

We also had optimistically estimated a greater number of planted acres and under estimated the amount of time for coordination and establishment of these sites. These factors contributed to the reduction of monitoring in 2019.

Adaptive Management

After evaluation of all the 2019 results, we considered if any of the goals established for 2020 – 2023 required adjustment. In respect to the goals previously established for mowing, daylighting and establishing habitat sites, we find that adjustments in the goals would be premature. Evaluation of the goals established for monitoring were found to warrant adaptive management adjustment. The revised goals are presented in Table 3.



Table 3. Adjusted Future Goals

| Conservation Action | Goals | | | | | | | |
|--|-----------------|----------------------|------------------|----------------------|------------------|----------------------|------------------|----------------------|
| | 2020 | | 2021 | | 2022 | | 2023 | |
| | acres | credits ¹ | acres | credits ¹ | acres | credits ¹ | acres | credits ¹ |
| reduced mowing or increased conservation mowing ² | 4,108 | 381,428 | 4,108 | 381,428 | 4,108 | 381,428 | 4,108 | 381,428 |
| daylighting | 1,000 | 42,850 | 1,000 | 42,850 | 1,000 | 42,850 | 1,000 | 42,850 |
| planted sites | 55 | 2,357 | 110 | 4,714 | 110 | 4,714 | 110 | 4,714 |
| annual beneficial acres | 5,163 | | 5,218 | | 5,218 | | 5,218 | |
| Credits gained for year | | 426,635 | | 428,991 | | 428,991 | | 428,991 |
| 10% Net Benefit Set Aside | | 42,663 | | 42,899 | | 42,899 | | 42,899 |
| Annual Credits | | 383,972 | | 386,092 | | 386,092 | | 386,092 |
| Annual Effects ³ | | 371,250 | | 371,250 | | 371,250 | | 371,250 |
| CREDITS AFTER OFFSETTING ANNUAL EFFECTS ⁴ | | 12,722 | | 14,842 | | 14,842 | | 14,842 |
| ACCRUED CREDITS ⁶ | | 768,944 | | 783,786 | | 798,628 | | 813,470 |
| ACCRUED SET ASIDE ⁶ | | 197,290 | | 240,189 | | 283,088 | | 325,987 |
| Monitoring requirement for credit approval ⁵ | 129 | | 130 | | 130 | | 52 | |
| Adjusted monitoring expectations | 25 ⁷ | | 100 ⁸ | | TBD ⁹ | | TBD ⁹ | |

¹ credits = # milkweed stems above baseline or prior condition

² 2020 - 2023 goals are a constant that is half the average of reduced & conservation mowing achieved in 2016-2018

³ average 2019-2022 TIP effect of 23,250 + annual mowing effect of 348,000 used as a constant

⁴ monarch and yellow banded bumble bee credits; frosted elfin and regal fritillary credits due to host plant availability are not considered.

⁵ monitoring goals based on 2016-2018 daylighting; monitoring of planted acres occurs in the year following establishment

⁶ Adjusted with actual 2019 reported numbers

⁷ 10 PSU monitoring protocol testing sites + 15 additional acres

⁸ 60 PSU daylighting research sites + 40 additional acres

⁹ Adjustments to be recommended based on 2020 and 2021 results and reporting



Scorecard Monitoring Data Sheets