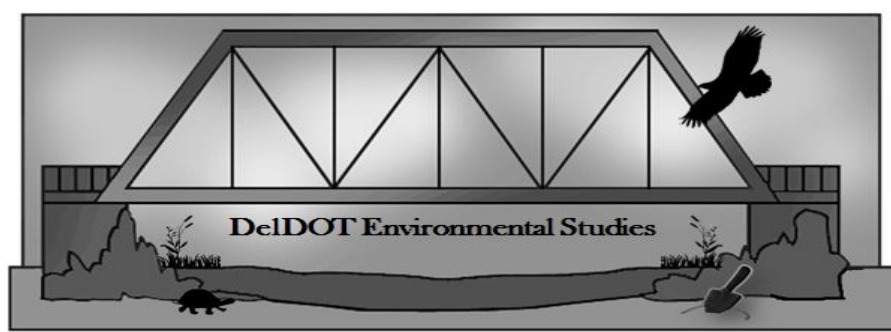
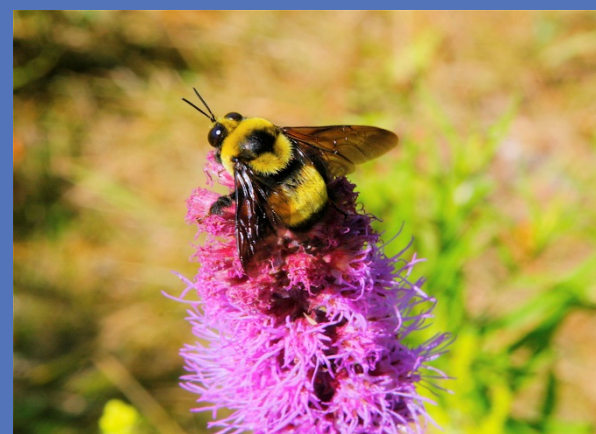


# Partnering to Create Delaware's First Pollinator Mitigation Site

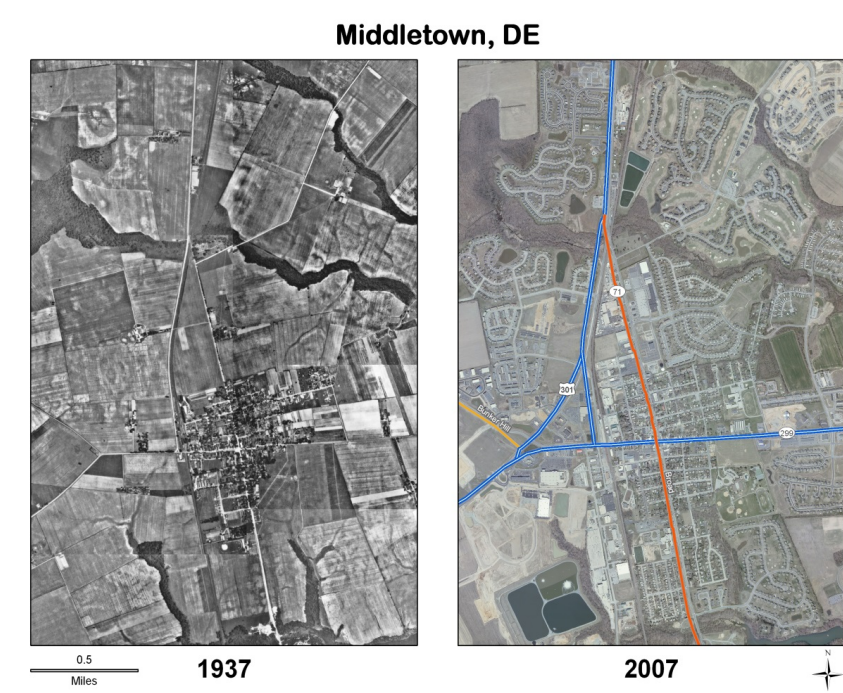
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## Introduction

Pollinator diversity and prevalence have declined over the past half century, due in part to lost habitat. Pollinators need native, flowering plants and places to lay eggs/nest. Many parts of Delaware that were once agricultural strongholds are rapidly being converted to residential uses, leading to fewer fallow fields and marginal areas, where many wildflowers grow. In response to a Delaware Department of Natural Resources and Environmental Control (DNREC) request, DeIDOT sought to explore whether it would be possible to create a pollinator mitigation site.

DeIDOT's mitigation requirements tend to vary dramatically from year to year. Recently, the development of a new alignment for Route 301 led to hundreds of acres' worth of wetland, reforestation and riparian mitigation requirements around Middletown, Delaware. Prior to residential development, the area was primarily agricultural. In recent years, explosive growth has led to loss of early successional habitat for birds and other pollinators.



Aerial pictures that show the extent of development in Middletown, DE.

DeIDOT's typical mitigation sites are forested wetlands or upland. Although the agency monitors these sites for years after their creation (to satisfy regulatory requirements), it does not actively maintain these sites.



DNREC performs a burn on one of their meadows.

Creating and maintaining early successional habitat, presents different challenges than forested sites. In Delaware, early successional habitat is ephemeral, quickly turning to forest if left untouched. Primarily for these reasons, research was needed to determine whether it would be logistically possible to create a pollinator mitigation site.

## Objectives

DeIDOT sought to determine whether the agency could create a pollinator mitigation site. DeIDOT worked through the following questions:

- (1) Is a pollinator mitigation site even possible?
  - (1) How are pollinator meadows created?
  - (2) How are they maintained?
  - (3) Can they fit within DeIDOT's mitigation requirements?
- (2) Is a pollinator site feasible?
  - (1) What are the challenges and is it possible to overcome them?
- (3) How should the site be designed and installed?
  - (1) Is there specialized equipment or knowledge required?
  - (2) Who would perform the installation?
  - (3) Who would perform the maintenance?

## Pollinator Mitigation Site Exploration Process

### STEP ONE: Q: Is a pollinator mitigation site possible? A: YES

During the first part of our investigation into creating a pollinator site we performed a **literature review** and **expert interviews**. While the literature reviews yielded really helpful region-specific content explaining the benefits, installation and ideal seed mixes for meadows, it was really the interviews with Delaware experts that proved most valuable. We spent time in the field studying meadows throughout Delaware, and we learned from the experts' past experiences.

- (1) **Meadow creation** – Installation of meadows requires specialized equipment and knowledge. For instance, different species of wildflowers have seeds that weigh different amounts and need to be drilled to different depths. In Delaware, there are not many contractors who have experience with or access to this equipment.
- (2) **Meadow maintenance** – According to the literature and interviews, meadows must be actively maintained to prevent forest from forming. The literature promotes two options: (a) reduced mowing regimes, and (b) prescribed burns. As will be discussed below, DeIDOT ruled out using a reduced mowing regime for its pollinator mitigation work.
- (3) **Regulatory requirements** – Most of DeIDOT's mitigation work is done to offset wetland impacts. To make things easier, we tried to identify non-wetland mitigation obligations for DeIDOT's first attempt at a pollinator site. Fortunately, DeIDOT was able to find a site that had been slated for reforestation to satisfy riparian buffer mitigation requirements. In this case, the stream was already relatively well buffered, so during negotiations DNREC was open to the idea of trying something new.



This is one of DNREC's meadows in its first year. In later years, there will be more diversity

### STEP TWO: Q: Is a pollinator site feasible? A: YES

During the first step, we identified a number of challenges associated with creating a pollinator mitigation site, which were analyzed in the second step of our process.

- (1) **Prescribed Burns** – Even though much of the literature described reduced mowing regimes as a good alternative to prescribed burns, our experts informed us that if we wanted to favor wildflowers over the long-term prescribed burns are necessary. In their experience, even reduced mowing regimes eventually result in dense grassland after ten or so years. Because DeIDOT has a limited ability to actively maintain mitigation sites, and because we wanted to be able to commit to ideal pollinator habitat over the long-term, we decided it would be imperative to find a way to burn our site. Fortunately, the Forest Service has a special burn program. However, burning limited some of our site options because burns should not be conducted too close to a major road and the wind direction is really important.
- (2) **Mitigation Requirements** – DeIDOT's existing mitigation requirements are not designed to favor investment in early successional habitat, like pollinator meadows. In the mid-Atlantic, most vegetation wants to proceed through succession into forest. However, over the past couple hundred years early successional habitat has been really important in Middletown due to all the farmland. Current mitigation efforts and regulatory interpretations seem to favor reforestation. Because DeIDOT was engaged in a large project, we were better able to pick an ideal site that would not pose too many problems. This made it easier to convince agency partners that it was worth trying something new, especially because DNREC considers early successional habitat some of the most valuable habitat in the state for conservation purposes. Nevertheless, we have been warned that it might be more difficult to make this argument for wetland impacts.
- (3) **Maintenance Timing** – Our experts informed us that once our meadow was established, we should expect to burn it every two to three years. However, there are certain times of year when it would be really harmful to pollinators to burn the field (e.g., during the nesting or growing seasons). Other time limitations were that it might be too green, too wet or too windy to burn the fields. We were advised that for our site, late winter/early spring burns would work best.
- (4) **Flower Species** – Ideally, pollinator sites should contain diverse, native, flowering plants that bloom throughout the growing season. In Middletown, Delaware, goldenrods and asters reliably appear in fields during the late summer and early fall. Therefore, DeIDOT focused on identifying spring and summer blooming species to include in its mix. DeIDOT collected seed mix lists that had been used by others to create meadows in the area. The lists were compiled, cross-checked to ensure species were native and then a spreadsheet was created to ensure high pollinator value and bloom times across the growing season. We worked with our state botanist to get feedback about our proposed list and to ensure that species were indeed native.
- (5) **Equipment & Expertise** – There are only a few people in Delaware who construct and maintain meadows. This type of project is not something most contractors have experience with (in Delaware). We were concerned that our project could end up part of a larger contract and that it might be awarded to someone with little or no experience. It might also be difficult for the contractor to get access to the appropriate equipment.
- (6) **Cost Comparison** – DeIDOT was able to look back at expenses associated with other mitigation sites to come up with a price comparison. DeIDOT obtained price quotes for wildflower seed mixes (based on both premixed and bulk seed prices). It then calculated the amount that would be needed per acre. Then it compared that price to all of the expenses required per acre for a forested site. Although DeIDOT's pollinator meadow will need to be burned (an expense that will be paid to the Forest Service) and specialized equipment will have to be rented to plant the seed, the prices for the seed mix is similar to what the agency spends to stabilize forested sites before it even plants the trees. In the end, DeIDOT should be able to create the site for the same amount or perhaps a little less than if it were creating a forested site.
- (7) **Site Access** – Because heavy equipment needs to enter the site during the initial installation, and burn crews will need access to the site in subsequent years, it is important that the site be relatively accessible.

### STEP THREE: Q: How should the site be installed and maintained? A: MULTI-AGENCY PARTNERSHIP

DeIDOT is in the process of drafting memoranda of agreements to formalize its relationship with DNREC and the Delaware Forest Service. DNREC has been an invaluable partner on the design of the site and will be responsible for installing the site in 2019. The Forest Service has approved the site for inclusion in its burn program, which shelters DeIDOT from concerns about determining whether it is safe to burn at a particular site. And the Forest Service performs the public outreach, creates the burn plan and obtains the necessary permit.

DeIDOT is not in the meadow building/burning business. It makes sense that the agency would reach out to state experts who already do this work. Through this partnership the agencies have identified other areas of cooperation and have fostered stronger working relationships. Moreover, DeIDOT is able to compensate DNREC for the use of its time and equipment, while also having the peace of mind that the field will be installed correctly.

## Dove Nest Site

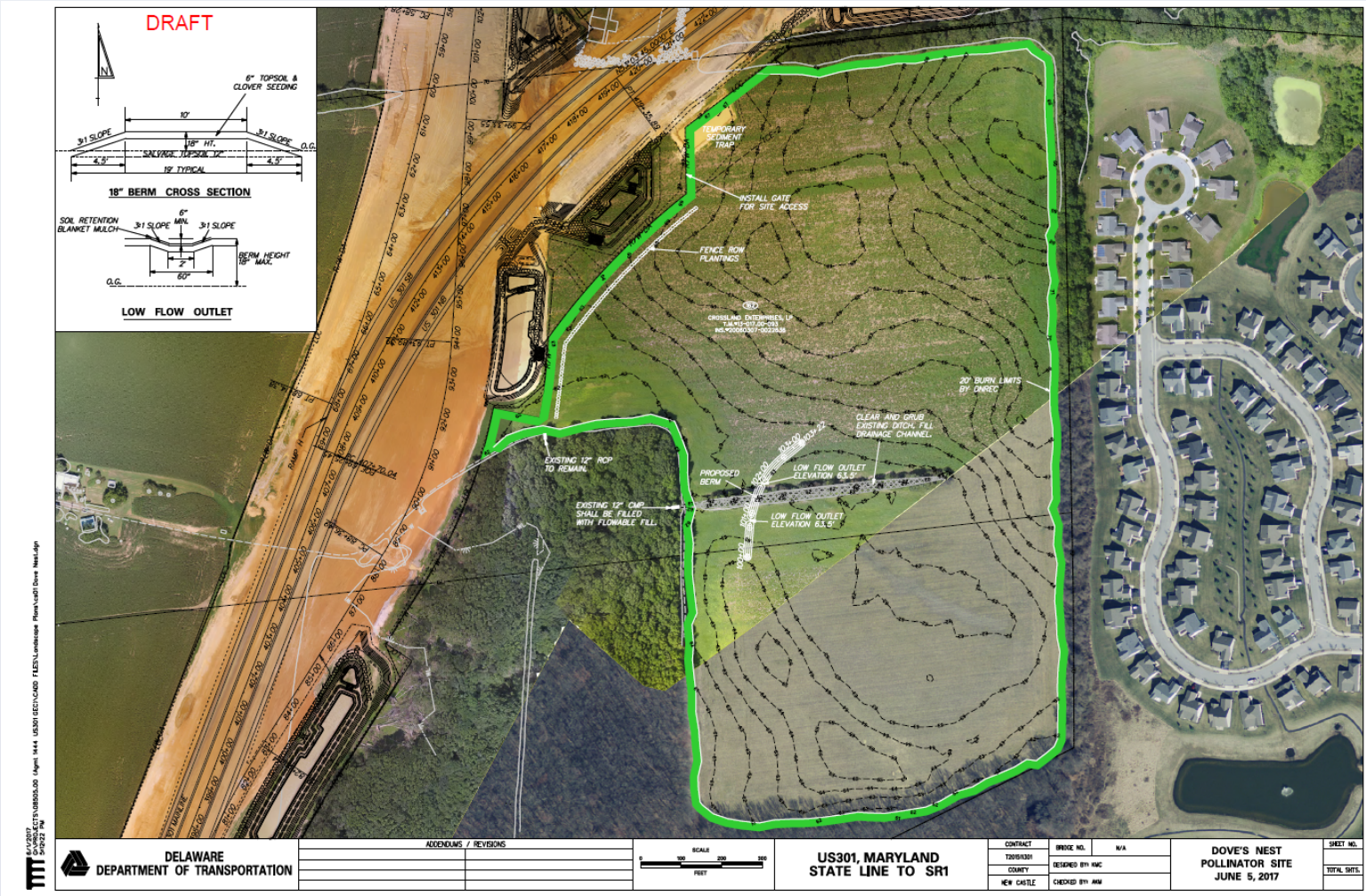
Dove nest is a 43-acre former farm-field. DeIDOT will install the field in 2019, during which all work will be performed by DNREC or the Delaware Forest Service.

DeIDOT anticipates that the field will be burned in late winter or early spring of 2019. Later, in the early spring, the field will be disked and then seeded with a no-till drill. A diluted formulation of the herbicide, Plateau, will be applied to suppress unfavorable plant species.

An approximate thirty-foot fire break will be created around the perimeter of the field by planting clover, which is also an early blooming flower for pollinators.

Other design features include the removal of a hedgerow in the center of the field and planting of a fencerow along the only un-forested side. The hedgerow will be removed in an effort to pick up meadowlarks that are losing habitat close to this site. A ditch that currently runs beneath the hedgerow will be filled and a small berm will be created to flank the hydric soils. We hope this will lead to a portion of the field functioning as wet meadow.

The seed mix for the field was identified with the help of the state botanist and by identifying high pollinator value flowers that bloom in mid-summer. The native seedbank should supply fall-blooming asters and goldenrods.



## Conclusion

DeIDOT hopes to expand on its pollinator work by creating a small pollinator wetland meadow, which would also be in Middletown. Although pollinator meadows will most likely never compete with the agency's forested mitigation work, DeIDOT hopes to increase pollinator habitat where it can and apply the lessons that it has learned at Dove Nest.

## Acknowledgements

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