

Maryland Environmental Service Pollinator Habitat Plan

June 2017

(Revised November 2018)

The purpose of the *Maryland Environmental Service Pollinator Habitat Plan* (referred to in the following as the “MES Plan”) is to provide Maryland Environmental Service (MES) property managers with Best Management Practices (BMPs) for the maintenance, creation, enhancement, and restoration of pollinator habitat on MES owned properties. The MES Plan was developed in accordance with Maryland House Bill 132 “State Government – Pollinator Habitat Plans and Maryland House Bill 830 “State Government – Pollinator Habitat Plans – Plan Contents – Requirements and Prohibition”, §2–1801(b) of the Agriculture Article. HB 132 was passed by the Maryland General Assembly in 2016 and amended by HB 830 in 2017 in order to utilize public lands for pollinator habitat enhancement projects. The legislation requires that three state agencies (Maryland Department of Natural Resources (DNR), State Highway Administration (SHA), and MES) each establish, in consultation with the Maryland Department of Agriculture (MDA), a specified pollinator habitat plan by July 1, 2017 for implementation on the properties owned by each agency.

The guidelines presented in the MES Plan follow the guidance provided by the MDA’s 2016 managed pollinator protection plan publication, *The Maryland Pollinator Protection Plan* and also the finding of the 2015 Maryland Department of Legislative Services report, *Pollinator Health and the Use of Neonicotinoids in Maryland*. The MES Plan includes BMPs for the maintenance, creation, enhancement, and restoration of pollinator habitat on MES properties and presents strategies for the implementation of these practices. In addition, the MES Plan presents a brief description of the pollinator habitat restoration projects that MES is currently implementing in coordination with Federal and State agencies on properties that MES manages under contracts with the Maryland Department of Transportation’s Port Administration.

The MES Plan will be presented to the Maryland Legislative Committees by January 1, 2018 and implemented by July 1, 2018 as required by legislation.

Introduction

Pollinators are the animals that assist with the fertilization of plants by moving pollen from one flower to another flower on the same plant or to a flower on a different plant of the same species

when they come to flowers to feed. Generally, plants that are not fertilized are unable to produce fruit or seeds for reproduction. Concern regarding the loss of pollinators in Maryland and nationwide has increased in recent years as the decline of domesticated European honey bees and native pollinator species has been documented in scientific papers and reported in the news. The MDA publication *The Maryland Pollinator Protection Plan*, which was completed in April 2016, addresses statewide concerns regarding the decline of pollinators in Maryland and was designed to support the Environmental Protection Agency’s (EPA’s) national effort to develop Managed Pollinator Protection Plans (MP3s) in each state. The MDA publication provides guidance on how pollinator health in Maryland can be addressed by commercial beekeepers and by land managers on farms, in gardens, on roadsides, and on open lands in Maryland and recognizes that the protection of both managed pollinator species and native pollinator species in Maryland is essential to Maryland farming businesses and natural ecosystems.

Domestic European honey bees (*Apis mellifera*) are managed pollinator species that are used for the pollination of many crop species in Maryland. Domestic honey bees, as well as native species of pollinators, including bees, wasps, flies, butterflies, moths, birds, and beetles, promote a healthy farming economy and healthy ecosystems in Maryland. Table 1 provides a list of some of the farm crops that are grown in Maryland which require or can benefit from the presence of pollinators including some native pollinator species. According to *The Maryland Pollinator Protection Plan*, farm fields located near natural areas tend to have more bee species and higher crop fruit set than those surrounded only by farmland and farm crops. Habitat diversity is one reason many apple growers in Maryland get their pollination services from wild bees, without having to rent the use of domesticated honey bees.

Table 1: Contribution of Insect Pollinators to Crop Yields
(Adapted from *The Maryland Pollinator Protection Plan*)

Soybeans	18% higher yield and heavier seeds when honey bees and wild bees are present
Apple	Flowers are self-sterile and depend heavily on cross-pollination by bees to bear marketable fruit
Watermelon	Require at least 8 visits from pollinators for proper fruit set
Strawberries	Require at least 20 bee visits per receptacle, and receive complementary pollination benefits from honey bees and wild bees.
Green Beans	Seed yields are 9% - 35 % higher with bumble bees present
Raspberries	Set more and heavier fruit when pollinated by bees
Cucumbers	Tend to be misshapen when not fully pollinated by bees

Research suggests that a combination of stressors have contributed to the loss of honey bees and to declines in the populations of other native pollinator species nationwide. These stressors include the loss of foraging and nesting habitat, pests, disease, and pesticides. Of these, the use of pesticides and neonicotinoid pesticides in particular, has been the focus of research and debate. Due to concerns about the use of neonicotinoids, the State passed The Maryland Pollinator Protection Act of 2016 which restricts the sale and use of neonicotinoid pesticides in Maryland to persons trained in handling and using these pesticides.

Neonicotinoids are a class of insecticides which were developed in the 1980s as an alternative to other pesticides that are more highly toxic to humans. Because they are less toxic to human, they are now widely used for landscapes, crops, and in the home. The Maryland report, *Pollinator Health and the Use of Neonicotinoids in Maryland*, found that although there is no clear indication that pesticides, including neonicotinoids, are the cause of honey bee population declines, there is a growing body of evidence that suggests that persistent, low concentrations of neonicotinoids pose a significant risk to honey bees and other nontarget organisms. Studies have shown that exposure of honey bees to field-realistic levels of neonicotinoids have resulted in the following sublethal effects: reduced foraging success; difficulty navigating and orienting; impairment of memory and learning; impairment of brood and larval development; damage to the central nervous system; increased susceptibility to parasites, such as the Varroa destructor mite, and diseases, such as the Nosema infection; and reduced hive hygiene. Research has found that exposure of honey bees to neonicotinoids via direct contact occurs most often when neonicotinoids are applied as a foliar spray or from the dust that is released when coated seeds are planted. However, it has also been found that neonicotinoid pesticides persist in the soil after plants have been treated and studies have shown that plants can pick up neonicotinoid residues remaining in the soil from applications in previous years. Research has also shown that neonicotinoid pesticides pose a serious risk to other pollinators including butterflies and to a wide range of other invertebrates such as earthworms and vertebrates including birds.

MES Managed Properties and Programs

MES provides environmental services to Maryland citizens through contracts with state and local agencies. MES owns a number of properties, however most of the properties that are managed by MES are owned by other state and local agencies including over 200 water and wastewater treatment plants and 15 solid waste, recycling, and composting facilities. MES also manages a number of environmental restoration projects and public outreach programs through various contractual agreements with the Maryland Department of Transportation's Port Administration (MPA). These restoration projects benefit pollinator habitat and MES managed public outreach programs cover themes related to pollination and the importance of invertebrate conservation. Recently, the Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island, which is managed by MES on behalf of MPA, was designated as a "Monarch Waystation" by Monarch Watch,

which recognizes the creation and maintenance of habitat that provides food and shelter for monarch butterflies throughout their migration and reproduction cycles.

MES managed facilities include active and inactive Dredged Material Containment Facilities (DMCFs) and a Beneficial Use Site, which are on properties that are owned by the MPA. Mitigation and habitat restoration projects on these properties are planned in coordination with various local, regional and federal conservation agencies including the US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Maryland Department of the Environment (MDE), and Maryland Department of Natural Resources (DNR). These projects are carried out with consideration towards value to wildlife, including pollinators. Upland and wetland restoration plantings at habitat restoration sites are accomplished using regionally native plants that are beneficial to pollinators such as maples, dogwoods, and sumacs, along with a wide variety of native wildflowers and bunchgrasses.

MES Owned Properties

As shown in Table 2, MES currently owns 9 property parcels comprising approximately 962 acres. These properties include: solid waste disposal and recycling facilities, environmental remediation areas, water and wastewater facilities, and office facilities.

Table 2: MES Owned Property

Property Name	Total Acres (approximate)	County
MES Headquarters	5	Anne Arundel
MES Headquarters (Solar Field)	1.7	Anne Arundel
MES Headquarters (Additional Property)	15.5	Anne Arundel
Poplar Island Landbase Office and Parking Area	1.3	Talbot
Darlington Water Plant	1.3	Harford
Sludge Entrenchment Site PG-4	403.8	Prince George’s
Midshore I Landfill	178.7	Talbot
Midshore II (Holly Road Site)	121	Caroline
Midshore II Landfill	205.5	Caroline

Best Management Practices

Honey Bees and other pollinators, including butterflies, moths, humming birds and the many species of insects that help to pollinate native plants, have two basic habitat needs: a diversity of flowering native or naturalized plants (including larval host plants for butterflies and moths), and egg-laying or nesting sites. The following list of BMPs was adapted from *The Maryland*

Pollinator Protection Plan and should be implemented to enhance and protect existing habitat on MES properties.

Conservation Practices

1. To the extent possible, preserve existing natural native vegetation and control invasive exotic species of plants which can smother natural vegetation. Areas with native vegetation provide nesting sites and forage plants for many species of pollinators and natural areas generally require little maintenance and provide long term self-sustaining habitat.
2. When possible, leave dead trunks and branches in the landscape for utilization by wood nesting bees and beetles. Solitary bee species nest in hollow or pithy plant stems, downed logs, leaf litter, and old beetle holes.

Pesticide Use

1. Avoid the use of pesticides when possible and do not use any neonicotinoid pesticide or pesticides that are labeled as toxic to bees or other pollinators. If pesticides are used, labels and specific guidelines for the use of the pesticide should be followed to minimize impacts to non-target species. Many native plants attract beneficial insects and other beneficial invertebrates including ground beetles and spiders that prey on pest species.
2. The *Maryland Pollinator Protection Plan* prohibits the use of pesticides toxic to pollinators and the use of seeds or plants treated with any neonicotinoid pesticide in in Pollinator Habitat Areas. These pesticides are absorbed by plants and may be present in the soil that comes with the plants. Neonicotinoid pesticide that is absorbed by plants or taken up from the soil through their roots can be present in the pollen and nectar from these plants, making these pesticides available to bees that feed on pollen and nectar.
3. Accept some plant damage on plants such as Milkweeds (*Asclepius*) that are meant to provide habitat and a food source for butterfly and moth larvae.

Pollinator Planting

1. Use pollinator-friendly plants in landscaping and choose a mixture of plants that bloom in spring, summer, and fall. Consider also including some deer resistant species. In areas with a large deer population, browsing deer can eventually kill plants and although there are few plants that deer will completely avoid, there are some species that are less likely to attract deer.
2. Provide flowering plants other than highly modified cultivars. Whether native or non-native, flowering plants that have been highly modified through breeding have often lost pollen and nectar, or are too complex for bees to navigate.
 - a. Use a combination of flowering woody and herbaceous plants to provide pollen and nectar as well as native bunchgrasses and sedges that will provide habitat for overwintering insects.
 - b. Use native plant species that are hardy and well adapted to the region. Often the native species that grow along the roadsides near a site are the best adapted species for the site and will be more likely to reseed and spread. These might include common milkweed, asters, and goldenrod.
 - c. When using wildflower seed mixes look for locally collected (locally sourced) seeds that are from plants that are more likely to be able to adapt to local conditions and be self-sustaining on the planting site.
 - d. Choose shrubs and trees such as dogwood, blueberry, cherry, willow, and maples that provide nectar in early spring when food is scarce.
 - e. Where the maintenance of low growing turf grass is required around facilities, allow pollinator-friendly dandelions, clover, and other flowering lawn plants to bloom. These flowers can provide important early season pollen and nectar sources when other floral resources are sparse.

Maintenance

1. Native bunchgrasses and herbaceous perennial flowers such as black-eyed susan, purple coneflowers, and goldenrod die back in the fall and should be allowed to remain in place to provide seeds for wildlife and habitat for beneficial insects including butterflies. Many native bee species spend the winter in the pithy stems of perennials.
2. Leave some areas undisturbed. Most solitary bee species nest in the ground, in bare patches of semi-loose soil. Deep or frequent tilling can disturb nests. Bumble bees tend to nest in old rodent burrows, cavities, abandoned bird nests, and brush piles.

3. Provide water to establish plantings and consider using an irrigation system for planting until the roots have grown enough to allow plants to become established and drought tolerant.
4. Clean-up:
 - a. Maintain a leaf mulch layer in planting beds and add mulch only if necessary.
 - b. Leave some stems and leaf cover in planting beds over the winter. Many pollinator species only travel a short way from their nests, so it is important that nesting habitat be located near flowers that attract pollinators. Leaving seed heads may allow plants to reseed and spread.
 - c. Be careful to not dispose of weeds, clipped branches and grass clippings in natural areas since the accumulation of brush will block light to native plants and encourage the growth of invasive weed species.

MES Plan Implementation on MES Properties

The *Maryland Pollinator Protection Plan* recommends that the single most effective action that can be taken to boost healthy populations of both resident wild bees and domestic honey bees is to plant native wildflower habitat. The Xerces Society guide, *Establishing Pollinator Meadows from Seed*, provides the basic steps to establishing habitat and is included as Attachment 1 to this document. Although much of the acreage on MES owned properties is developed or is currently utilized for solid waste management, portions of these properties consist of forested areas that can be protected. Areas that are intensely maintained landscaped and grassed open areas and roadsides present opportunities for the maintenance, creation, enhancement, and restoration of pollinator wildflower habitats.

The Maryland Pollinator Protection Plan suggests a minimum goal for establishing pollinator habitat of having at least three plant species flowering at all times from early spring through late fall. To achieve this goal they recommend using a diverse wildflower mix composed mostly of seeds from wildflowers (and fewer grass seeds) so that grasses do not crowd out the herbaceous plants. A number of regional pollinator plant lists and planting guidelines are available. Specifically, a good seed mix will contain plants that host butterfly larvae (e.g., milkweeds for monarch butterflies) and bunchgrasses that provide nesting habitat for bees and birds. Native seed nurseries that provide regionally-appropriate seed and stock are available in Maryland and neighboring states. Seed vendors and nurseries can be found through Plant Native and The Xerces Society's milkweed seed finder. Webpages that provide guidelines and nursery or seed sources and regional pollinator plant lists are listed below.

- The Xerces Society (<http://www.xerces.org/>)
This site provides examples of *regional seed mixes, vendor information, planting instructions, and a seed mix calculator*

- Pollinator Partnership (<http://www.pollinator.org/>)
- Maryland DNR (<http://dnr2.maryland.gov/wildlife/Pages/default.aspx>)
- Plant Native (<http://www.plantnative.org/>)

MES owned properties are described below and aerial photos of the property parcels are provided in Attachment 2.

MES Headquarters, Solar Field, and Additional Property

The MES headquarters is located in Millersville on approximately 22 acres of property in Anne Arundel County, Maryland (Figure 2-1 and 2-2). The headquarters building and landscape were awarded certification for Leadership in Energy & Environmental Design (LEED) in 2011/2013, which recognizes efforts to use innovative solutions to build and manage buildings that are better for our environment. The headquarters property has recently been expanded to include an additional property to the south of the building where parking and office space may be constructed in the future. Work is currently underway to expand plantings of native plants to the newly purchased property and around the headquarters’ building, and a field of recently installed solar panels in order to renew the LEED certification for the MES building landscaping.

The landscaping at MES Headquarters already includes some pollinator-friendly plants including trees, shrubs and native bunchgrasses. These areas could be improved with the addition of pollinator-friendly planting and the implementation of BMPs such as leaving some stems and leaf cover in planting beds over the winter. A forest conservation area adjacent to the existing parking lot protects native plant communities including some mature trees, stumps, and fallen tree limbs. The open field areas under the solar panels, which are currently planted with turf grass, could be replanted with a variety of low growing native meadow pollinator species. Although a portion of the additional property that was purchased more recently may be used for the construction of an additional parking, office space and stormwater infiltration facilities, portions of this area, which is currently planted in turf grass, could be planted with pollinator-friendly native trees, shrubs and meadow. Stormwater infiltration facilities will be designed to both comply with the MDE’s Environmental Site Design standards to the maximum extent practicable and to incorporate native plants.

Poplar Island Landbase Property (Office and Parking Area)

The approximately 1.33 acre Poplar Island Landbase property is located in the town of Tilghman in Talbot County, Maryland (Figure 2-3). The site serves as a parking area and office on the mainland to provide a support office and off-island parking and boat landing areas to accommodate transportation to the Paul S. Sarbanes Ecosystem Restoration Project on Poplar Island. The grounds include some tree, shrub and perennial garden plantings around the main building and parking lot. Portions of the turf grass surrounding the building could be replaced

with additional pollinator-friendly native plantings. The area on the bay side of the parking lot on the edge of the salt marsh could also be utilized for additional pollinator-friendly plantings.

Darlington Water Treatment Facility

The approximately 1.3 acre Darlington Facility is located in Harford County, Maryland in a residential neighborhood and serves 92 homes and small businesses (Figure 2-4). MES purchased the facility from the county and provided retrofits to the 50 year old water system in 1998. The facility has been jointly managed by MES and the water services provider since that time.

The site is primarily vegetated with mowed turf grass suitable for pollinator-friendly upland plantings including native herbaceous and woody species.

Sludge Entrenchment Site PG4 Property

The 403.8 acre PG4 Property is located in Rosaryville in Prince George's County, Maryland (Figure 2-5 and 2-6). MES purchased the PG4 property in 1977 for use as a disposal site for treated sewage sludge (which are referred to as biosolids). Biosolids from Blue Plains and Piscataway Wastewater Treatment Plants were applied to this property in the late 1970s. Groundwater and Surface water monitoring is conducted on the site by MES for the Washington Suburban Sanitary Commission (WSSC) and the District of Columbia Water and Sewer Authority (DC WACA). It is anticipated that monitoring at the site will be discontinued in the near future since nitrate and chloride levels have reached acceptable levels.

Much of the site has regrown with native vegetation and, according to the Prince Georges County Master Plan, the property may eventually be incorporated into (and become part of) the Piscataway Creek Stream Valley Park. Currently, the vegetation on the site consists of woodlands and open fields. A total of approximately nine acres of open field were planted by MES with native tree species in 2013 in coordination with the Maryland DNR Natural Filters Program. Management of this property could incorporate BMPs for the protection and enhancement of pollinator-friendly species.

Midshore Landfill Operations Facilities (I and II)

Located on the Eastern Shore of Maryland's Chesapeake Bay, the Midshore Regional Solid Waste System consists of four planned facilities to serve the municipal solid waste needs of Talbot, Caroline, Kent, and Queen Anne's Counties for 80 years. To date, two of the four landfills have been constructed (Midshore I and II), both of which are owned and operated by MES. The three properties that make up the MES owned facilities are shown in Figures 2-7, 2-8, and 2-9.

The Midshore I landfill property (178 acres) accepted solid waste from 1991 through December 2010 and is now closed. MES collects and manages the water that drains from the closed landfill

and manages the landfill gas extraction and monitoring of landfill gas and groundwater at the site and in the area. MES also operates a solid waste transfer facility and Homeowner Drop-Off Center for the citizens of Talbot County. Waste from these operations is transferred to the Midshore II Landfill in Caroline County, and the source-separated recyclables are transported to processing facilities for recycling.

The Midshore II Landfill, in Caroline County, began full-scale commercial operation in January 2011. This 205.5 acre site will continue to operate through 2030. The facility receives solid waste at an average volume of 400 tons per day.

The Midshore properties include large, open areas of mowed turf grass and may be suitable for pollinator-friendly upland plantings with native herbaceous and woody species.

References:

Maryland Department of Agriculture. 2016. *Maryland Pollinator Plan*. May 2016.
<http://mda.maryland.gov/plants-pests/Documents/MP3-Pollinator-Plan.pdf>

Maryland Department of Legislative Services. 2015. *Pollinator Health and the Use of Neonicotinoids in Maryland*. October 2015.
<http://mgaleg.maryland.gov/pubs/legislegal/2015-pollinator-health.pdf>

Maryland Department of Natural Resources. 2016. *Promoting Pollinators on Power Facility Properties in Maryland, Power Plant Research Program Draft Report*. August 2016.

The Xerces Society for Invertebrate Conservation. 2013. *Establishing Pollinator Meadows From Seed*. www.xerces.org

Attachment 1
The Xerces Society's Guide to Establishing Pollinator
Meadows from Seed

Attachment 2
MES Property Parcels