REPORT ON THE DEVELOPMENT AND MAINTENANCE OF THE VIRGINIA POLLINATOR PROTECTION STRATEGY

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Commissioner

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Final Report on the Development and Maintenance of the Virginia Pollinator Protection Strategy

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Final Report on the Development and Maintenance of the Virginia Pollinator Protection Strategy

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Executive Summary

The 2016 Session of the Virginia General Assembly enacted the Virginia Pollinator Protection Strategy (Strategy) (Va. Code § 3.2-108.1), which requires the Virginia Department of Agriculture and Consumer Services (VDACS) to establish and maintain a Virginia Pollinator Protection Strategy to promote the health of and mitigate the risks to all pollinator species and ensure a robust agriculture economy and apiary industry for honey bees and other managed pollinators. The Strategy is to include a plan for the protection of managed pollinators that provides voluntary best management practices for pesticide users, beekeepers, landowners, and agricultural producers.

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BACKGROUND AND OVERVIEW

Pollinators contribute substantially to food production and the economy in the United States. Pollination adds value to the nation's agricultural output, and pollinators are vital for the development of many of Virginia's crops such as apples, pumpkins, watermelons, cucumbers, squash and berries.

In recent years, there has been a significant loss of pollinators, including honey bees, native bees, birds, bats and butterflies. The continued loss of commercial honey bee colonies poses a threat to the economic stability of commercial beekeeping and disruption of pollination operations in the United States and could have profound implications for agriculture and food production. Scientists believe that bee losses are likely caused by a combination of stressors, including poor bee nutrition, loss of habitat, parasites, pathogens, lack of genetic diversity, and exposure to pesticides.

On June 20, 2014, a Presidential Memorandum was issued entitled "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators." The memorandum resulted in the creation of the Pollinator Health Task Force, which, in turn, developed the National Pollinator Health Strategy. As a result of the Presidential Memorandum and the National Pollinator Health Strategy, VDACS developed *Virginia's Voluntary Plan to Mitigate the Risk of Pesticides to Managed Pollinators* which focuses on communication between beekeepers and pesticide applicators and the use of best management practices to reduce the exposure of bees and other pollinators to pesticides.

In 2016, the Virginia General Assembly enacted legislation requiring VDACS to develop and maintain a Virginia Pollinator Protection Strategy (Strategy) (Va. Code § 3.2-108.1) that provides a basis for the protection of pollinator populations in Virginia through the use of best management practices by pesticide users, beekeepers, landowners, and agricultural producers. Key components of *Virginia's Voluntary Plan to Mitigate the Risk of Pesticides to Managed Pollinators* have been included or referenced in the Strategy.

In June 2017, VDACS provided an interim report on the Strategy to the Senate Committee on Agriculture, Conservation and Natural Resources; the House Committee on Agriculture, Chesapeake and Natural Resources; and the Board of Agriculture and Consumer Services.

ADVISORY COMMITTEE

Section 3.2-108.1 of the Code of Virginia requires that VDACS solicit assistance from state agencies and other stakeholders in developing the Strategy. VDACS established an advisory committee that consists of representatives from:

- Ashland Berry Farm
- Beekeepers of Northern Shenandoah
- Fort A.P. Hill
- Responsible Industry for a Sound Environment (RISE)
- United States Department of Agriculture, Natural Resources Conservation Service
- Virginia Agribusiness Council
- Virginia Crop Production Association
- Virginia Department of Agriculture and Consumer Services
- Virginia Department of Conservation and Recreation
- Virginia Department of Environmental Quality/Virginia Coastal Zone Management Program
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Transportation
- Virginia Farm Bureau Federation
- Virginia Native Plant Society
- Virginia Nursery & Landscape Association
- Virginia State Beekeepers Association
- Virginia Tech, Department of Entomology
- Virginia Cooperative Extension
- Virginia Turfgrass Council

PROTECTION OF MANAGED POLLINATORS

Section 3.2-108.1 requires that VDACS provide for the protection of managed pollinators through the development of best management practices for pesticide users, beekeepers, landowners and agricultural producers. The Strategy must include a plan to support (i) communication between beekeepers and applicators, (ii) reduction of the risk to pollinators from pesticides, (iii) increases in pollinator habitat, (iv) maintenance of existing compliance with state pesticide use requirements, (v) identification of needs for further research to promote robust agriculture and apiary industries, and (vi) identification of additional opportunities for education and outreach on pollinators.

1. Communication between beekeepers and applicators

VDACS completed *Virginia's Voluntary Plan to Mitigate the Risk of Pesticides to Managed Pollinators* (Plan) in May 2017. The Plan enhances communication between beekeepers and pesticide applicators by promoting the notification of beekeepers regarding upcoming pesticide applications that may impact their honey bees. Advance notification enables beekeepers to take measures to prevent the unintended exposure of honey bees to pesticides. To promote this communication, VDACS has made available an online communication tool (FieldWatch™) which allows beekeepers to designate the location of their honey bee hives on an online mapping system along with their contact information. Pesticide applicators can use the mapping system to find honey bee hives in close proximity to a planned treatment site so that advance notification can be provided to the beekeeper. The online communication tool was introduced to beekeepers during the winter of 2018. Participation in the Plan and the use of FieldWatch by beekeepers and pesticide applicators is voluntary.

The Plan can be found on VDACS' pollinator protection webpage at: http://www.vdacs.virginia.gov/plant-industry-services-pollinator-protection-plan.shtml and Fieldwatch can be accessed on VDACS' Beekeeping and Apiary Inspection webpage at: http://www.vdacs.virginia.gov/plant-industry-services-beekeeping-apiary-inspection.shtml.

2. Reduction of the risk to pollinators from pesticides

The Plan includes general guidelines for protecting pollinators as well as specific Best Management Practices (BMPs) that were developed by stakeholders and can be used by applicators and beekeepers to protect pollinators. It is anticipated that the BMPs will not only reduce the risk of exposure of honey bees to pesticides but to all pollinators as well. General guidelines for protecting pollinators can be found on pages 7 – 8 of the Plan, and the BMPs can be found on VDACS' pollinator protection webpage at http://www.vdacs.virginia.gov/plant-industry-services-pollinator-protection-plan.shtml.

3. Increases in pollinator habitat

Adequate pollinator habitat ensures food and nesting sites are available for pollinators. Managing pollinator habitats allows pollinator populations to thrive and reproduce year after year, resulting in the pollination of plants in the surrounding landscape.
Many areas that were once primary pollinator habitat no longer exist. Suburban development and other land use changes have decreased the number and quality of pollinator habitats. Ornamental plants found in today's landscapes are typically not native to Virginia or may not

provide adequate pollen or nectar for pollinators, and many of Virginia's agricultural crops are not the preferred food source for pollinators. However, there are many native pollinator species in Virginia that thrive in habitats of non-agricultural natural communities and pollinate crops and ornamental plant species. Therefore, a landscape that includes large areas of intact native pollinator habitat can benefit the surrounding agricultural and suburban landscapes. It is anticipated that increasing pollinator habitat and improving existing habitat will increase pollinator populations across the Commonwealth.

Many of Virginia's governmental agencies recognize the importance of pollinators and have developed strategies to address the pollinator health issue in the Commonwealth. State agencies have installed pollinator gardens; conducted research to determine the conservation status and population trends of pollinators and native host plants; managed state, federal, and privately-owned lands to improve pollinator habitat; and conducted outreach to educate the public. These programs are already benefitting pollinators, and it is the recommendation of the Advisory Committee that focusing future efforts on the continuation and expansion of these programs is a cost-effective way to improve pollinator populations and provide immediate benefits for pollinators.

Below is a description of the activities that state agencies are currently undertaking to protect and improve pollinator populations in the Commonwealth:

Virginia Department of Conservation and Recreation (DCR)

DCR is responsible for conserving, protecting, enhancing, and advocating wise use of the Commonwealth's unique natural, historical, recreational, scenic, and cultural resources. This mission requires that DCR consider the health and resilience of native pollinators. DCR's Division of Natural Heritage and Division of State Parks have implemented strategies to protect Virginia's pollinators.

DCR/Division of Natural Heritage (DNH)

In an effort to protect pollinators and their habitats, DNH has undertaken three major initiatives:

1. *Define the status and conservation needs of Virginia's pollinating fauna.*

   To define the status and conservation needs of the pollinating fauna of Virginia, DNH maintains Virginia's statewide biological inventory of flora and the pollinators on which they depend. In Virginia, these pollinators include bees, beetles, flies, butterflies, moths, and numerous other groups of invertebrates as well as hummingbirds. This inventory forms much of the core work of DNH and includes research into the scientific literature,

examining museum collections, and conducting extensive fieldwork throughout Virginia. This inventory, now in its 32nd year, has yielded benefits such as:

- Lists of all plants, moths, butterflies, and bees known from Virginia and their conservation rankings;
- Determined the locations and status of rare plant and pollinator populations;
- Determined plants and pollinator species that are rare, declining, and in need of conservation and established the knowledge base on plant-pollinator relationships;
- Development of a website that provides information on rare species of butterflies and moths; and
- Identified, manage, and permanently protected two sites as Natural Area Preserves for a rare pollinator species.

2. *Protect and restore Virginia's natural communities.*

DNH believes that Virginia's natural communities, with their full complement of native flora, provide the best protection for our native pollinators. DNH manages 63 Natural Area Preserves (NAP), consisting of nearly 57,000 acres, to protect the natural communities and rare species at these sites, all of which have significant biodiversity resources. In addition to direct protection of NAPs, DNH works with federal and state conservation agencies, land trusts, private conservation organizations, and others to promote the protection of key tracts of land with significant natural communities and pollinator populations. Twenty-one of Virginia's NAPs are not owned by DCR, but are designated and managed as NAPs through a Deed of Dedication.

DNH uses a variety of techniques to control non-native invasive plant populations in order to maintain the quality of native plant communities. In addition, DNH partners with other natural resource agencies to reintroduce fire through controlled burning. Fire is a vital ecological disturbance needed to restore many of Virginia's natural communities and pollinator populations.

3. *Manage fields and other anthropogenic habitats for pollinator habitat.*

In addition to protecting and managing natural communities, DNH provides guidance on habitat restoration of old fields, management of native meadows and grassland, and other anthropogenically-maintained habitats in Virginia to benefit pollinators. Virginia's utility rights-of-way are particularly important, providing a substantial land base for pollinator habitat when managed in native vegetation. DNH provides recommendations to Dominion Energy for management of native plant species and the pollinator species

that utilize these plants within utility rights-of-way and recommendations regarding seed mixes associated with the proposed Atlantic Coast Pipeline. Extensive solar development is planned for Virginia that is projected to span tens of thousands of acres in the next two decades. Solar facilities represent an opportunity to provide extensive pollinator habitat, and DNH is working with the Department of Environmental Quality to develop guidance for solar facilities to help ensure pollinators are minimally impacted by this industry.

DCR/Division of State Parks (DSP)

The mission of DSP is to conserve natural and cultural resources and provide recreational and educational opportunities consistent with the good stewardship of those resources. There are currently 41 parks covering over 73,000 acres, and, of that acreage, approximately 4,000 acres are maintained as open areas and managed as pollinator habitat to include warm season grasses and native wild flowers. As many of these areas were originally used for agriculture or converted to fescue, management techniques to convert these areas to native species has included the use of prescribed fire, treatment of invasive species with pesticides, and reseeding areas with species native to the region.

In 2017, DSP implemented an initiative to reduce mowing in certain areas in an effort to increase available pollinator habitat. The initial target was a 20 percent mowing reduction at 16 parks, which resulted in 320 acres that are either no longer mowed or mowed only once a year during a period identified to lessen the negative impacts to pollinator life cycles. In addition to reduced mowing, there are also initiatives to convert areas at state park facilities to native landscaping and create butterfly gardens to provide interpretive and educational opportunities to park guests.

Virginia Department of Environmental Quality/Virginia Coastal Zone Management (CZM) Program

The CZM Program is a network of state agencies and local governments established in 1986 to protect, restore, and strengthen Virginia's coastal ecosystems and economy. The Virginia Department of Environmental Quality (DEQ) is the lead agency of this network. The program exists through Executive Order and is funded by the National Oceanic and Atmospheric Administration (NOAA) under the federal Coastal Zone Management Act. Most of CZM's annual $3 million grant funding is distributed to state agencies and planning district commissions through sub-grants.

To ensure native pollinator populations can thrive, adequate populations of native plants must be available to pollinators. One of the ongoing initiatives supported by the CZM Program is

regional native plant marketing campaigns focused on promoting awareness of the aesthetic and ecological benefits of native plants, and educating and demonstrating to the public the importance of native habitat for wildlife, especially birds and pollinators. Marketing campaigns are currently underway in the Northern Virginia, Central Rappahannock, Northern Piedmont, Northern Neck, and Eastern Shore areas of Virginia. In addition, marketing campaigns are being developed for Southeast Virginia (including Hampton Roads), the greater Richmond area, and Roanoke. The marketing campaigns include regional native plant guides with information on planting for pollinators and identifying species that support pollinators. The regional campaign strategies also include point of sale materials such as plant tags and signs at garden centers. Regional team members represent the Virginia Native Plant Society, Master Gardeners and Naturalists, garden clubs, Soil and Water Conservation Districts, Division of Natural Heritage, local and regional governments, and other regional non-governmental organizations. These regional campaigns provide an outlet to share additional information about pollinators through a variety of multi-media and direct contact with the public.

In addition, nine demonstration gardens or landscapes were established on the Eastern Shore and 67 were identified in the Northern Virginia, Northern Neck, Southeastern Virginia, and Central Rappahannock regions that visually showcase the appeal of native plants as not only beneficial to the environment but also as colorful, beautiful additions to any home garden. The gardens, which provide plant identification markers and interpretive signage and materials, illustrate native plant groupings and layering for specific landscaping themes and growing conditions such as rain gardens, street-side spaces, woodland edges, and planting for pollinators.

The CZM Program also initiated a statewide native plant marketing partnership of public, private, and business organizations to identify and prioritize opportunities to collaborate on Virginia native plant communication and marketing efforts and form cohesive and coordinated messaging and strategies to increase local availability and use of native plants. In 2017, the partnership launched a new website as a hub for native plant information, which can be found at www.PlantVirginiaNatives.org.

Virginia Department of Forestry (DOF)

DOF has increased pollinator habitat through the planting of the following pollinator gardens:

Cumberland State Forest:

- Four acres of pollinator habitat was established with a pollinator seed mix that included little bluestem, purple coneflower, blue vervain, and 12 other species. This project was conducted in cooperation with the Virginia Department of Game and Inland Fisheries;

- Ten acres of ladino clover and four acres of buckwheat, sunflower, white millet, and sorghum were established. A total of 30 acres of clover have been established on state forest lands; and
- Seven acres of lespedeza were established and are mowed annually, with an additional eight acres of fields that receive alternating strip mowing annually.

Appomattox-Buckingham State Forest:

- Nine acres of Perdovik sunflower were planted along with strips of buckwheat, millet, and sorghum; and
- Fourteen acres were planted with wheat and Ladino clover.

For the 2017 – 2018 seedling season, DOF's Augusta Forestry Center nursery sold seedlings that support pollinators. The pollinator-supporting species included black locust, American plum, black cherry, persimmon, and yellow poplar. DOF's Garland Gray Forestry Center is establishing a containerized seedling operation predominantly for pine species, with plans to investigate the feasibility of growing pollinator-supporting species in containers.

DOF also partnered with a non-profit honey bee organization to study the placement of bee hives near American chestnut trees. DOF is planning to expand the study to other locations in state forests where pollinator habitat has been established.

Virginia Department of Game and Inland Fisheries (DGIF)

Virginia's Wildlife Action Plan

DGIF's Wildlife Action Plan, which was developed in 2005, identified over 50 species of butterflies and moths as Species of Greatest Conservation Need. Virginia's Wildlife Action Plan was revised in 2015 with greater emphasis on pollinators and pollinator habitats. Seven species of bumble bees and the monarch butterfly were added to the list of Species of Greatest Conservation Need. The 2015 plan also describes methods to increase and manage "open habitats" such as post-agricultural properties, clear cuts, glades, and savannas for the benefit of pollinators and other grassland species.

Northern Bobwhite Quail Action Plan

The Northern Bobwhite Quail Action Plan for Virginia was created to help identify and reverse those problems that limit quail populations in Virginia. Habitat loss is the single most important issue impacting quail. The Northern Bobwhite Quail Action Plan recognized that native bees and other pollinators have declined with the loss of quail habitats. The habitat link between Northern Bobwhite Quail and native pollinators is emphasized in DGIF's recently revised *Quail*

and Early Successional Species Recovery Plan. The revised plan includes multiple strategies advocating collaboration with Virginia groups interested in pollinator conservation.

Private Land Habitat Plans

In collaboration with the Natural Resources Conservation Service (NRCS), DGIF employs five Private Lands Wildlife Biologists (PLWB) who work with private landowners on projects that support and contribute to the implementation of the *Quail and Early Successional Species Recovery Plan*. To date, the PLWBs have written over 2,300 habitat plans for landowners who own over 423,000 acres of private lands. It is estimated that habitat plans supporting a diversity of species, including pollinators, have been implemented on 35,000 - 40,000 acres.

Wildlife Management Area Plans and Open Land Management Plan

DGIF owns and manages over 206,000 acres on 42 Wildlife Management Areas (WMA). DGIF staff are developing new management plans for each of the WMAs that include an Open Land Management Plan to "…provide guidance for the future management of DGIF's open lands while using science-based best management practices." Creating and maintaining open habitats on public lands like WMAs was identified as an important conservation action for many of the species identified in Virginia's 2015 Wildlife Action Plan such as the monarch butterfly and regal fritillary. Currently, open habitats represent eight percent of WMAs and DGIF intends to incorporate and expand open habitat conservation on these properties.

Planning Resources to Support Pollinator Conservation

DGIF is currently working with the Piedmont Environmental Council, Smithsonian Conservation Biology Institute, and Virginia Working Landscapes program to identify appropriate plants and planting techniques to enhance pollinator benefits from habitat conservation efforts. This includes an Excel-based Seed Calculator developed by DGIF that can be used to determine region and soil-specific seed mixtures for pollinators.

Pollinator Conservation on DGIF Properties

DGIF is creating pollinator habitats on fish hatcheries located at Brookneal, Montebello, King and Queen, and Coursey Springs. In efforts consistent with DGIF's Quail plan, DGIF staff established nearly 2,200 acres of open habitats on DGIF properties.

Collaborative Efforts Resulting in Pollinator Conservation

DGIF worked with:

- A local chapter of Quail Forever to create a 10-acre habitat in Halifax County;
- DOF to create pollinator plantings on the Cumberland State Forest;

- The Culpeper Town Planner to install a pollinator garden at Yowell Meadow Park;
- Students and volunteers at Randolph-Macon College to maintain and enhance a habitat garden developed in 2011;
- Managers at Chippokes, Occoneechee, Staunton River, and Staunton River Battlefield state parks; McCallum More Museum and Gardens; and the Southern Virginia Botanical Garden to plan and develop pollinator habitats; and
- Public schools in Prince William, Gloucester, York, and Fairfax counties and the City of Hampton to implement habitat gardens to support wildlife and pollinators.

Virginia Department of Transportation (VDOT)

Pollinator Habitat Program

VDOT initiated the Pollinator Habitat Program (PHP) in 2014. PHP creates naturalized areas that are planted with native nectar producing and pollinator supporting plant species along state-maintained roadways, within rest areas, and within park and rides. The goals of PHP are to:

1. Provide habitat areas for threatened and dwindling pollinator species such as bees and butterflies;
2. Reduce maintenance costs by reducing mowing and other vegetation costs such as invasive species control and herbicide applications; and
3. Decrease erosion and stormwater runoff while providing sediment control, using fewer pesticides and increasing aesthetics.

The PHP started with four plots in 2014; three at park and rides and one at a Safety Rest Area (SRA) on Interstate 95 southbound near Dale City. A large meadow was added to the northbound side in 2015. In addition, area medians and roadsides in the Bristol District were seeded with native pollinator and grass species in the fall of 2015. VDOT PHP staff installed pollinator-friendly landscaping at the entrance to the northbound Ladysmith SRA building using trees, shrubs, grasses, and perennials native to central Virginia. A similar installation will occur at the southbound Ladysmith SRA, Skippers SRA, and the northbound New Market SRA. Additional pollinator gardens that focus on perennial plants in a meadow-style will be installed at both Ladysmith SRAs in the fall of 2018. VDOT PHP staff also worked with the Warsaw Residency on a pollinator meadow-style garden at its facility, with plans to install in June 2018.

Pollinator-friendly plantings are now considered for storm water facilities and park and ride facilities throughout the Commonwealth. The PHP is funded through the purchase of *Virginia Wildflower* and *Protect Pollinators* license plates. Funding from these two license plates generates approximately $240,000 per year.

Reduced Mowing

Reduced mowing can result in an increase in pollinator habitat for all pollinator life stages by allowing plants to mature and produce seeds. VDOT has implemented a revised mowing standard in its Best Practices Manual, which recommends no mowing between March 31 and November 1 each year. Educational materials, including videos on the agency's electronic bulletin board explaining the need for pollinators, provide pictures of common pollinator-friendly plant species, especially Common Milkweed.

VDOT is cooperating with Virginia Tech to identify ways to manage long-term sites in populated areas and to research potential effects of pesticide applications for invasive species control that occur near pollinator areas.

VDOT PHP staff has met with U.S. Department of Transportation (U.S. DOT) research facility staff to discuss different species, planting, and maintenance methods. The U.S. DOT staff has committed several areas at the research campus in McLean, Virginia, to pollinator habitat and has worked with VDOT PHP staff to incorporate new research areas each year.

4. Maintenance of existing compliance with state pesticide use requirements

VDACS is the state agency responsible for pesticide regulation in Virginia. Under authority of the Virginia Pesticide Control Act (Act) (Va. Code § 3.2-3900 *et seq*.) and pesticide regulations established pursuant to the Act, VDACS's Office of Pesticide Services (OPS) certifies pesticide applicators, registers pesticide products, issues pesticide business licenses, and educates pesticide users and the public about the benefits and risks of pesticide products. In addition, OPS staff conducts routine inspections and investigates complaints to determine if pesticides have been misused.

During fiscal year 2017, OPS certified 6,830 private applicators, 7,976 commercial applicators, and 8,478 registered technicians to apply pesticides in the Commonwealth. OPS also licensed 2,905 pesticide businesses and registered 15,798 pesticide products. Field staff conducted 2,912 routine inspections and related activities and initiated 131 investigations, including complaints, incidents, accidents, and related activities at 1,512 individual sites throughout Virginia. OPS staff also conducted 199 marketplace registration inspections, checking the registration status of over 3,000 products. OPS enforcement activities resulted in the issuance of 15 letters of caution, 28 stop sale orders and 88 civil penalties. Through these activities, OPS protects consumers and the environment while permitting the safe and effective control of pests that adversely affect crops, structures, health, and domestic animals.

5. Identification of needs for further research to promote robust agriculture and apiary industries

Ensuring that the apiary industry can thrive while still providing for a robust agricultural industry will require research to determine the causes of the decline in honey bee and other pollinator populations and the development of methods to increase pollinator populations. The Advisory Committee recommends that research focus on honey bees, general pollinators, and pollinator-friendly plants.

Pollinator Research Needs:

- Identification of and determination of the importance of existing pollinator habitats (including conservation lands), their acreage, and the habitat management strategies that would be most beneficial;
- Determination of the best practices and plant selections for each region of the Commonwealth when habitat conversions are necessary and how much land needs to be converted to have an impact;
- Assessment of the marketability of nursery plants for pollinator habitat;
- Strategies for management of pests that may infect more than one pollinator species and the best practices for testing and treatment for honey bees;
- Development of best practices for honey bee genetic diversity and survivability, including efforts to enhance honey bee parent stock for Virginia;
- Determination of the sub-lethal impact of insecticides, fungicides, and herbicides, including mixtures of these pesticides, on pollinators; and
- Assessment of the economic benefits of pollinators (native and non-native bees) to agriculture and nursery industry. Includes identification of pollinators most important in natural and managed systems.

6. Identification of additional opportunities for education and outreach on pollinators

Outreach and education are critical components of pollinator protection. Outreach and education should involve pollinator information provided on the internet, at retail locations, schools, and by government agencies (state and local). Landowners, agricultural producers, government agencies, urban developers, and citizens need accurate and readily available information regarding pollinators and pollinator protection in order to take steps that will be successful in improving pollinator populations.

VDACS

VDACS routinely conducts inspections of honey bee hives and gives presentations to beekeepers across the Commonwealth. During these inspections and presentations, information is provided to beekeepers on management recommendations for honey bee pests and plants that produce pollen and nectar. In addition, outreach to the general public, including schools and community groups, on honey bees is routinely provided.

Virginia Cooperative Extension (VCE):

VCE is focusing efforts on promoting literacy of integrated pest management and pollinator protection to both producers and beekeepers. Future efforts will address education focusing on the establishment and maintenance of pollinator forage and habitat based on scientifically and regionally relevant information. VCE will work extensively with Virginia Tech to incorporate research findings and advancements into current programs.

The CZM Program

CZM is a voluntary program that serves as the basis for protecting, restoring, and responsibly developing our nation's diverse coastal communities and resources. The Virginia CZM program has developed reference material on native plants specific to geographic areas and includes information on the native plants' benefits to pollinators.

DGIF

For the last several years, DGIF staff have incorporated and promoted pollinator conservation into its outreach programs. DGIF staff have incorporated information regarding pollinators in the DGIF Quail program workshop, field tours, forestry tours, and school events. DGIF staff frequently speak to beekeeper groups including the Southside Beekeepers and the Virginia Beekeepers Association. DGIF's WAP Coordinator has developed a program to train citizen scientists on how to photograph bumble bees and submit photos to BumbleBeeWatch.org for identification and documentation.

DCR/DSP

DSP provides an opportunity for interpretive and educational messaging. Using various methods of communication, state park guests can learn about the benefits of pollinator species and the plants needed for their survival. These methods include interpretive signage, blogs and articles, participation in Save the Monarch, and face-to-face programs with children and families. The hope is that by introducing park guests to the value of pollinators, they will take ideas home to implement.

SUMMARY

Virginia's state agencies are working to improve pollinator populations through the implementation of strategies such as (i) assessment of pollinator and pollinator-friendly plant inventories, (ii) planting native plants and pollinator gardens, (iii) protecting pollinator habitat, (iv) reduced mowing or controlled burning to enhance the growth of native plants, (v) outreach and education associated with pollinators, (vi) development of best management practices to protect pollinators, (vii) research related to honey bees and other pollinators; and (viii) enhancing communication between beekeepers and pesticide applicators to mitigate the exposure of pollinators to pesticides.

In addition, individuals and organizations have implemented pollinator protection activities. Virginia's pesticide applicators and beekeepers can use Fieldwatch to facilitate advance notification to prevent exposure of honey bees to pesticides. Military installations, non-governmental organizations, private landowners, and citizens are actively working to protect pollinators through the use of BMPs, planting pollinator gardens, and providing education and outreach related to pollinators. Together, the efforts of these individuals and organizations can improve pollinator populations in Virginia.

RECOMMENDATIONS

The Pollinator Protection Strategy Advisory Committee is comprised of representatives from state agencies and relevant stakeholder groups. The Advisory Committee recommends continued meetings to ensure objectives of the Strategy are met while preventing the duplication of efforts of the various state agencies. It is anticipated that continued meetings and coordination of efforts will allow for information sharing and efficient use of resources while improving pollinator populations.

Virginia's state agencies manage and benefit pollinator populations throughout the Commonwealth, and the Advisory Committee recommends continued use of state resources to increase and improve pollinator habitat through management activities on state-owned lands such as state parks, WMAs, and NAPs. These lands already provide the best habitats and are a source of populations of pollinators that benefit the broader landscape. Focused management of these and similar areas is recommended as an effective strategy for managing Virginia's pollinators. On a smaller scale, planting pollinator gardens with native plant species will also provide benefits. Strategies to establish pollinator gardens by Virginia's citizens as a means of increasing pollinator habitat should be encouraged as an important method of improving pollinator populations.

The Advisory Committee recognizes that Virginia's citizens and non-governmental organizations play a critical role in protecting pollinators, and, as such, outreach is necessary to ensure citizens are provided the information needed to improve pollinator populations. Coordination of outreach and education by the Advisory Committee should focus on providing Virginia's citizens with information related to the causes of decreasing pollinator populations and the strategies that can be implemented that will reverse this trend. Citizens who want to plant pollinator gardens need information regarding those plants that will be beneficial to pollinators. Virginia's land grant colleges, VCE, DCR, DEQ, DGIF, and VDACS have each developed pollinator information, including lists of native plants and the online Native Plant Finder, to enable citizens to easily select pollinator-friendly plants. Continuing current efforts to plant pollinator gardens on property owned or managed by DCR, DOF, DGIF, VDOT, and military installations is a cost-effective method of not only increasing pollinator habitat but also providing outreach and education related to pollinators.

The Advisory Committee identified areas of research necessary to improve pollinator populations in Virginia. The Advisory Committee identified research needs related to honey bees and pollinators, and this research is vital to ensure honey bee populations are protected from bee pests and pollinator habitat is improved. It is important to note that while honey bees provide a critical role in the pollination of certain crops, native pollinators can also play an important role in the pollination of agricultural crops and native plants, therefore, research related to all pollinators is needed.

In conclusion, the Advisory Committee recommends the continuation and/or expansion of existing pollinator related activities in the Commonwealth. Focusing on pollinator habitat; reducing risk of pesticides to pollinators; and enhancing communication, outreach, education, and research are the most practical and cost-effective methods of promoting the health of and mitigating the risks to all pollinator species while also ensuring a robust agriculture economy and apiary industry for honey bees and other managed pollinators.