

# Bee Campus USA - James Madison University

Report on 2024

## Pollinator Habitat Creation & Enhancement

*Please describe pollinator habitat creation or enhancement projects in your community in 2024, and whether your committee hosted them or not.*

- The East Campus Hillside area of campus which is home to three distinct native meadow areas all of which received enhancements (reseeding and invasive plant management) this past year. One of the meadow areas is located within the newly expanded and updated solar facility. This meadow was reseeded, and vegetative surveys were completed at 15 monitoring stations to maintain the university's VA Pollinator-Smart Solar Site certification. - At the EJC Arboretum on campus, a group of volunteers annually perform invasive plant management throughout the gardens and woods. They target multiflora rose, Tree of heaven, Euonymus, ligustrum, honeysuckle vines and shrubs, English ivy, Italian arum, Oriental bittersweet and more. - At the EJC Arboretum, a new native shade garden was installed and included many perennial plants that are pollinator friendly. - Invasive plant management in the riparian buffers campus wide was completed this year to improve that habitat, with the plan to reseed bare areas where there were monocultures of invasive species with a native pollinator-friendly mix appropriate for riparian buffers. - A campus community garden planted a summer cover crop in all of the beds for pollinators while students were away over summer break. The summer cover crop included mint species, comfrey, purple passionflower, sunflowers, buckwheat and cowpeas, The Bioscience building's pollinator gardens are maintained annually by students and faculty, this includes invasive plant management. - A stumpery was created in the arboretum's woods and will promote native bee habitat. - Another campus community garden growing on the rooftop patio of the ISAT building on campus is maintained by students and faculty. The garden has been growing there for over a decade, there are many flowering plants and herbs that provide food and habitat for pollinators.

*How many habitat projects did you help to create or enhance in 2024?*

10

*How many people (staff, volunteers, students, partners, etc.) helped with those projects?*

32

*How many projects benefit monarchs, milkweed, or nectar plantings?*

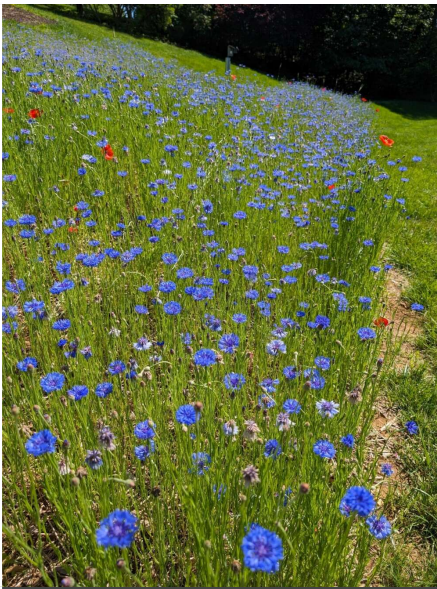
2

*How many total square feet of habitat were created or enhanced?*

137580

Please check all that describe the habitats your affiliate helped to create or enhance last year with pollinator benefit in mind.

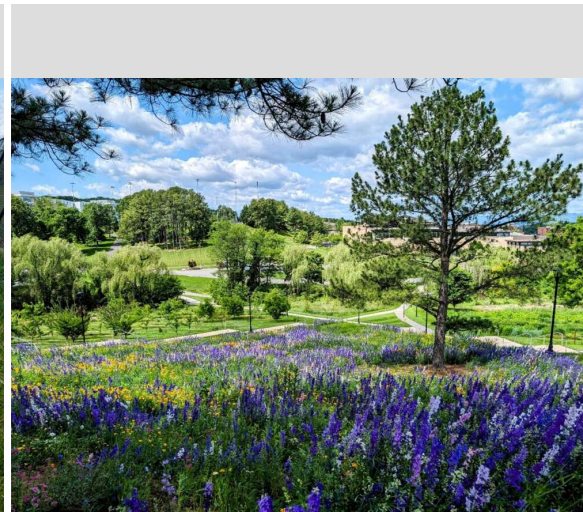
- Flower garden
- Vegetable garden
- Orchard
- Natural area with tree snags and stumps, and bare areas for ground nesting species
- Meadow
- Herb garden
- Native milkweed planting for monarchs and bees (where appropriate)
- Invasive/exotic plant species removal for habitat improvement
- Native pollinator-friendly tree planting
- School garden



First growing season for the new meadow seeding on a steep hillside at the Edith J. Carrier Arboretum. (Photo: Ali Sloop)



The East Campus Hillside Solar Meadow is one of several meadows on campus that are managed for invasive species and vegetative surveys are completed annually. (Photo: Ali Sloop)



The Triangle meadow on the East Campus Hillside of JMU is in spring bloom - this area is managed for invasive species. (Photo: Ali Sloop)

## Education & Outreach

Please describe pollinator conservation events or outreach activities in your community in 2024, indicating whether your committee hosted them or not.

- New to this year's report was a community event where the Bee Campus Advisory Committee partnered with the City of Harrisonburg and several other organizations to hold a Pollinators in Your Yard event with two speaking/learning sessions: 1) Native Pollinators and Their Favorite Plants and 2) Protecting Pollinators From Pests and interactive learning stations for kids to adults. Two members of the Bee Campus Advisory Committee were speakers in both of the talks at this event. - The EJC Arboretum on campus held numerous pollinator related education events: spring wildflower walks where pollination are discussed, Monarch butterfly tagging and release family friendly program, A Night Fliers Bug hunt focused on those pollinators that are active at night, and the arboretum has two staff members on the Bee Campus committee. The arboretum hosted a summer camp for elementary and middle school aged students where the whole week was focused solely on pollinator education and having campers complete the Xerces X-Kids book. - The local Harrisonburg High School Earth Club visited JMU's East Campus Hillside Meadow and Land Bridge Meadow to learn about native grasses and flowers of the meadows with a JMU Bee Campus Advisory faculty member. - Geography students, led by a Bee Campus Advisory Committee faculty member, participated in an Earth Day celebration at a local elementary school, the undergraduates led the elementary students in pollinator identification games and surveys of pollinators on the school grounds and gardens. - The Harvest Fest at the Arboretum included the student Geography Club leading families and community members in a pollination and pollinator activity. The Harvest Fest also included a poster presentation showcasing the research done to document the species of butterflies found in Harrisonburg and on campus. - This past summer the University was recognized by the partnering agencies and review board of the VA Pollinator-Smart Solar Site certification program by a sign presentation on campus. Agency partners presenting the sign to upper administration of the university shared the importance of modeling how solar sites can work in harmony with native plants and native pollinators and be mutually beneficial.

*How many pollinator-related events or outreach activities did you host or help with in 2024 (in total)?*

7

*How many people attended those events (in total)?*

735

*Number of permanent interpretive/educational/Bee Campus USA signs installed to date?*

17



Elementary students completing a pollination activity during the week-long Summer Explorer's Camp at the Edith J. Carrier Arboretum. (Photo: Katie Rankin)



Gail Martin presenting at the Monarch tagging workshop at the Edith J. Carrier Arboretum. (Photo: Ivy Makia)



Members of the Bee Campus Advisory Committee with upper administration and partner agencies at the presentation of the VA Pollinator-Smart Solar Site certification sign. (Photo: Jordan McLean)



VA Pollinator Smart Solar Site sign marking JMU's solar facility as being certified through the state program. (Photo: Ali Sloop)

## Curriculum, Continuing Education, & Service Learning

*Please describe the curriculum your campus engaged in 2024, indicating whether it was part of a for-credit course or continuing education.*

- Continuing education classes consisted of lectures at the EJC Arboretum on campus as part of their continuing education series for adults. The lectures listed below are ones where most of the content of these included native pollinator and native plant education. Continuing education courses titles were: 1) Gardening with Native Plants, 2) Plants for Pollinators, 3) Native Pollinators, 4) Wonderful World of Insects with Master Gardeners (WWOI), 5) WWOI Part 2, 6) WWOI Part 3, 7) Virginia Native Flora Application and 8) Beneficial Insects and Insect House Build. - GEOG 210 (Physical Geography - Spring): Students participated in a field day event at a local elementary school to plant

native seeds (especially milkweed and coneflower seeds) in the school garden and the meadow area. – GEOG 340 (Biogeography – Spring): This class included a week-long module (lecture, lab, and field work) covering pollination and pollinator importance. The module emphasized bumblebees of Virginia. Students were instructed about the pollinator habitats on campus. Conducted surveys of spring pollinators on the east campus hillside and EJC Arboretum. Observations were documented on iNaturalist. This course also created a matching game focused on pollinators and birds of school gardens that was utilized at local schools in outdoor learning. – GEOG 490 (Senior Research – Spring): A student further studied the temporal and spatial analysis of butterfly data collected in Harrisonburg. – GEOG 490 (Senior Research – Fall): A student further studied the temporal and spatial analysis of butterfly data collected in Harrisonburg. Additional field surveys of butterflies were conducted by the student in this project/course. – ISAT 675 (Biodiversity Conservation – Fall): Graduate students learned more about biodiversity through studying pollinators, especially butterflies, on the JMU East Campus habitats. Harrisonburg City Public Works staff were invited to speak about Harrisonburg’s Pollinator programs and the use of iNaturalist for the Parks for Pollinators 2023: Harrisonburg VA competition. – GEOG 215 (Intro to GIS and Cartography – Spring and Fall): Bee Campus Advisory Committee collaborated with faculty to have a presentation on pollinators and the Bee Campus program at JMU and a lab where the students located pollinator habitat on campus and took geotagged photos that will be added to the campus online pollinator habitat map. – ISCI 173 (Life and Environmental Science for Teachers): Students learned about pollinators and then assisted with outdoor learning related to pollinators and pollinator habitat at a local elementary school field day. – ISAT 675 (ISAT MS Program – Fall): Master’s level course where students learned about biodiversity, which included a presentation from the City’s Greenspace Manager on the impact of climate change on plant viability, and the flower species that are planted by the city for resilience to heat and drought. The course also participated in the annual City Parks for Pollinators Bioblitz competition. – ISAT 320 (Fundamentals of Environmental Science): Students did a series of labs on the EC Hillside meadow that included pollinator habitat data collection – plant and invertebrate species richness and diversity measures. This is part of a long-term project looking at the relationship between the naturalizing native species of forbs and grasses and overall habitat quality.

*How many of your for-credit courses included pollinator-related information in 2024?*

11

*How many students attended those for-credit courses?*

230

*How many of your continuing education courses included pollinator-related information in 2024?*

8

*How many participants attended those continuing education courses?*

84

*Please describe the service-learning projects your students were engaged in 2024, indicating which, if any, were associated with a*

course.

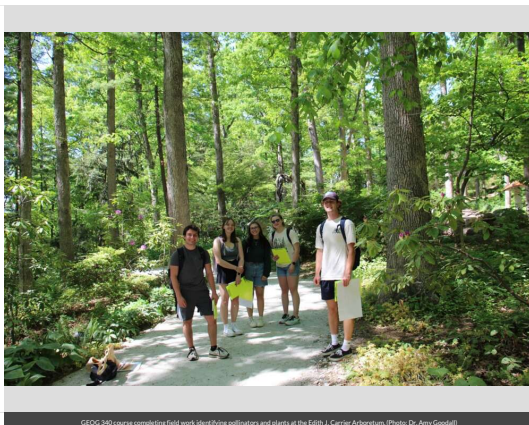
– A community garden space on campus, Madison Gardens, had one service-learning project this year. There was a fall work day with volunteers that included university students and JMU staff. This project was initiated by a committee member. Student volunteers learned about cover crops and why it is okay to leave some plant material over the winter because some pollinators will use it as cover/protection over the winter months. Students weeded the garden plots and seeded a fall cover crop and laid straw mulch down over the seeded beds. – The EJC Arboretum has many service-learning projects throughout the year that involve enhancing and maintaining pollinator habitat on their grounds. Student and community volunteers planted hundreds of native trees, replaced annual plantings with perennial plantings, many of which were native and several species important to pollinators along a wet weather stream on campus, in a native perennial shade garden, and in the floodplain within the arboretum. – The Edible Forest Garden on the EC Hillside is maintained by two undergraduate students. There were two service learning projects in the food forest this past year. The spring project involved replanting of some fruit trees that had died and planting understory herbaceous plants to promote pollinator habitat and increase efficiency of pollination for the trees. The fall service learning project involved planting 15 additional fruit trees at the food forest to capture the additional trees that did not survive the drought. Students performed mechanical removal of invasive plants in the tree rows. – Students worked in the Keister Elementary School pollinator and vegetable garden and planted winter cover crops as part of a geography course and another time students completed service-learning at the Keister gardens as part of the City of Harrisonburg's Pollinator Month celebration. – The ISAT rooftop garden beds were student maintained and students, led by a JMU faculty member, created a Bugs and Blooms project where they developed an app to track the timing of blooms in the garden and the presence of pollinators. The goal is to compare the timing of the blooms and the arrival of the pollinators and address the effects of climate change.

How many service-learning projects did your campus host and/or support to enhance pollinator habitat on- and off-campus?

8

How many students participated in service-learning projects in 2024 to enhance pollinator habitat on or off-campus?

167



GEOG 380 course completing field work identifying pollinators and plants at the Edible 1. Carrier Arboretum. (Photo: Dr. Amy Goodall)

#### TEMPORAL AND SPATIAL ANALYSIS OF BUTTERFLY DIVERSITY IN HARRISONBURG, VA



Students  
Jason Holman  
Danyu Miller  
Dustin Rodriguez  
Jacob Veronda

Advisers  
Amy Goodall  
Xiaojing Tang

We analyzed butterfly survey data collected by 34 teams of geography (GEOG 380) students during fall semesters from 2017–2024. The objective was to investigate temporal and spatial patterns in butterfly diversity and abundance as reported across 12 study areas in Harrisonburg. We found that students confirmed observations of 31 butterfly species from 5 families. Species most observed were cabbage white (*Pieris rapae*) and tachinids (*Atractodes* spp.). There were year-to-year differences in abundance of some species

including the monarch (*Danaus plexippus*) and common buckeye (*Junonia coenia*). Through remote sensing, our findings suggest that local and landscape-scale habitats are important for butterfly diversity in an urban environment. Study areas with greater butterfly diversity and abundance had a greater density of flowering vegetation and greater connectivity among habitat patches. We report findings and include our methods to filter butterfly data biases and to conduct remote sensing for habitat assessment.

Senior research project poster presented at a symposium that analyzed butterfly survey data. (Photo: Dr. Amy Goodall)



Geography

51

Pollinator scavenger hunt activity that Geography students created and facilitated for local elementary school outdoor learning. (Photo: Dr. Amy Goodall)



Students planting herbaceous, pollinator friendly plants in the understory at the Edible Forest Garden on campus. (Photo: Jorden McLean)



Geography students plant for pollinators at a meadow area on a local elementary school grounds. (Photo: Dr. Amy Goodall)

## Policies & Practices

*Please describe actions taken to make pest management more pollinator-friendly.*

– To make pest management practices more pollinator friendly, JMU implements an Integrated Pest Management (IPM) Plan that serves as a guideline for the following: (1) Outline the goals of pest management at JMU, (2) Identify the responsible parties for pest management, (3) Outline performance measurement, quality assurance and control strategies, (4) Outline steps to identify pests at JMU (5) Outline the practices and strategies used to enforce pest control at JMU, (6) Outline how pesticides are stored and applied on campus grounds, (7) Outline preventative strategies for pest infestation. The JMU IPM plan applies to all 770 acres of the university campus grounds. This includes JMU designated habitat areas. The university aims to protect habitat areas on campus using pesticide conservatively across campus and to minimize site management practices on habitat areas. The IPM promotes the use of a range of preventative and non-chemical approaches to control pest populations and stave off infestation. IF an infestation with unacceptable impacts occurs, thereby warranting additional treatment, IPM favors the use of least-toxic pesticides – such as Neem and horticultural oil for insect pests such as whiteflies, aphids and Japanese beetles. Chemicals and pesticides are used only in targeted locations and for targeted species. The targeted application of a toxic pesticide is allowed only after all other reasonable non-toxic options are exhausted. The type and quantity of all pesticides used on campus are tracked and the location of each use is also documented. To reduce pesticide use, mechanical practices are also employed. Good housekeeping strategies are used as preventive measures, such as cleaning trash regularly, clearing debris and providing adequate drainage. In addition, new plantings are selected in habitat areas based on appropriate climatology. The IPM policies are executed by trained technicians who receive certification every two years and formal training.

*In your city or campus, are any policy initiatives underway to further protect pollinators, people or waterways from pesticides?*

– The University continues to maintain their Virginia Pollinator-Smart program certification for the solar facility and associated native meadow habitat within and around the facility. As part of this certification, the university has developed a vegetation management plan for the habitat and committed to eliminating any kind of insecticide use in that designated area. There are no official policy initiatives underway at the moment.

*Did your committee participate in any continuing education on ecologically-based Integrated Pest Management planning?*

– Committee members from the EJC Arboretum and Facilities Management staff attended the Xerces webinar on the new IPM toolkit.

*Please check actions you have taken to make pest management practices more pollinator-friendly.*

- Implemented or maintained a written IPM plan
- Only use pesticides as a last resort within the IPM plan
- Avoided use of pesticides in public sites containing designated pollinator habitat or other sensitive features (except when targeted use is deemed the best option for invasive or noxious weed, insect or disease management)
- Implemented non-chemical pest prevention and management methods on city or campus grounds

*Any lessons learned you would like to share?*

Ongoing maintenance needs for pollinator habitat areas, the essential need for consistent oversight and communication between faculty and staff and different departments in the outdoor learning areas that also function as outdoor classrooms.

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Committee Photo

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Learn More

Integrated Pest Management Plan: [ipm.pdf](#)

[https://www.jmu.edu/facmgt/sustainability/Bee\\_Campus/jmu-pollination.shtml](https://www.jmu.edu/facmgt/sustainability/Bee_Campus/jmu-pollination.shtml)

Recommended Native Plant List: [habitat.pdf](#)

<https://svswcd.org/wp-content/uploads/2016/08/Native-Plants.pdf>

Recommended Native Plant Supplier List: [habitat.pdf](#)

[https://www.jmu.edu/facmgt/sustainability/Bee\\_Campus/jmu-pollination.shtml](https://www.jmu.edu/facmgt/sustainability/Bee_Campus/jmu-pollination.shtml)

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