Presentation to the Savannah River Site Citizens Advisory Board

Pollinator Activities on the SRS

July 24, 2018

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Professor, University of Georgia (UGA)

Objectives

- Pollinator Declines in the US
- Current Pollinator Activities on the SRS
- Proposed Pollinator Research/Management Activities

Consistent with the Facilities Disposition and Site Remediation Committee's 2018 Work Plan

Acronyms

ACP	Area Closure Project
DOE	Department of Energy
DOE-HQ	Department of Energy – Headquarters
DOE-SR	Department of Energy – Savannah River
NERP	National Environmental Research Park
NNSA	National Nuclear Security Administration
SREL	Savannah River Ecology Laboratory
SRNL	Savannah River National Laboratory
SRR	Savannah River Remediation
SRS	Savannah River Site
UGA	University of Georgia
USDA	U.S. Department of Agriculture
USFS-SR	U.S. Forest Service – Savannah River

Pollinator Facts

- **Honey bees pollinate approximately $10 billion worth of crops in the United States each year. However, of the hundred or so crops that make up most of the world's food supply, only 15% are pollinated by domestic bees, while at least 80% are pollinated by wild bees and other wildlife**

- More than 100,000 different animal species - and perhaps as many as 200,000 - play roles in pollinating the 250,000 kinds of flowering plants on this planet. Insects (bees, wasps, moths, butterflies, flies, beetles) are the most common pollinators, but as many as 1,500 species of vertebrates such as birds and mammals serve as pollinators, including hummingbirds, perching birds, flying foxes, fruit bats, possums, lemurs and even a lizard (gecko)

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- US Fish and Wildlife Service

Pollinator Facts

- **Pollinators support biodiversity: There is a correlation between plant diversity and pollinator diversity**
- **For migratory pollinators, such as bats, hummingbirds and the monarch butterfly, the identification and protection of nectar corridors is important. If nectar is unavailable anywhere along their migratory route at the time of migration, it could result in the death of part of the population. Nectar sources near areas where pesticides are sprayed may be tainted or, where herbicides are used, eliminated.**
- At least 3 bat, 5 birds, and 24 butterfly, skipper and moth, one beetle and one fly species in the United States that are federally listed as endangered under the Endangered Species Act of 1973, as amended, are pollinators. It is unknown how many of the listed plants require pollinators.
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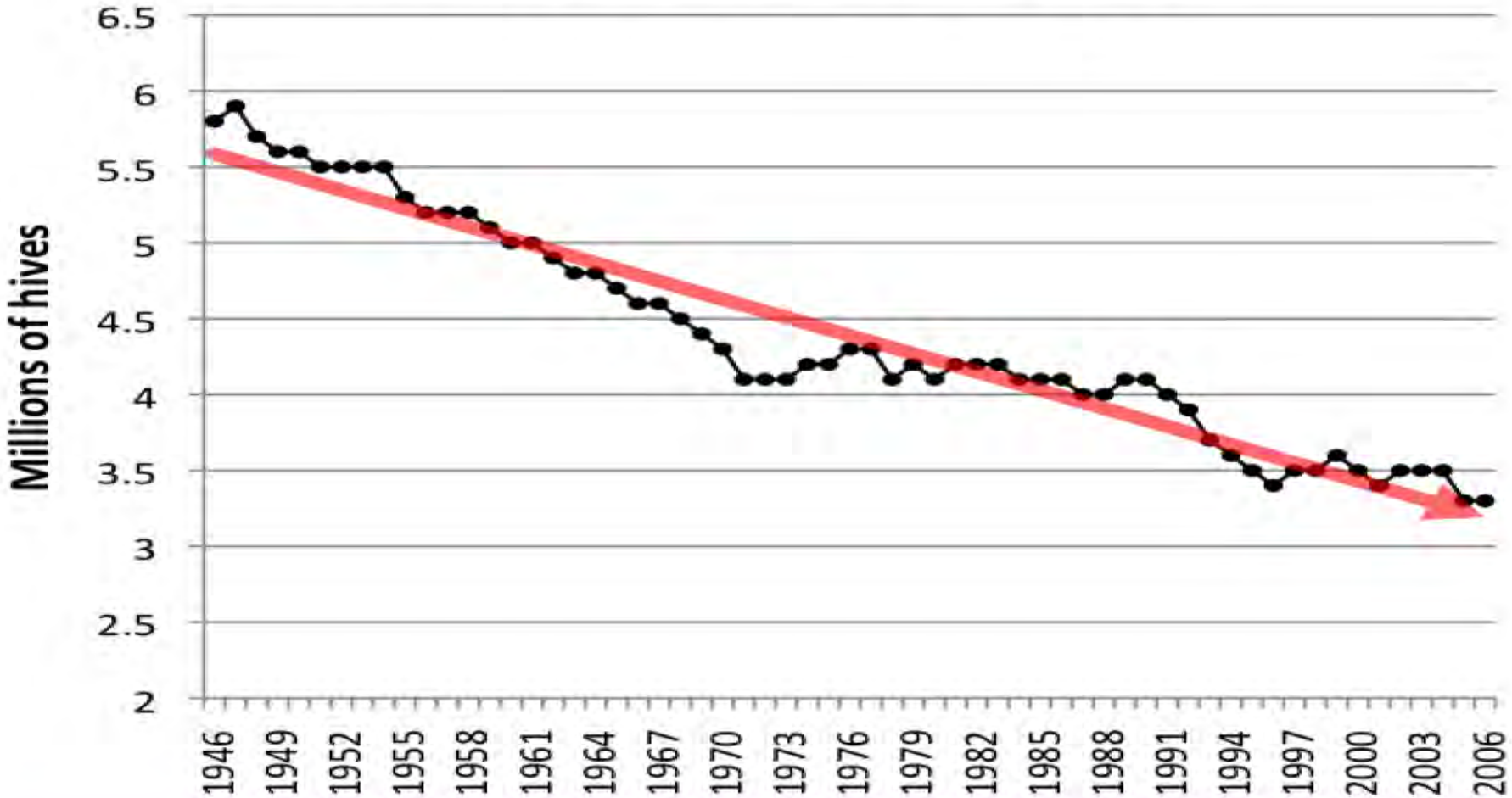
Wild Pollinators

- **Status: There is evidence of decline in the abundance of some pollinators, but the strength of this evidence varies among taxa. Lon - term population trends for several wild bee species (notably bumble bees) and some butterflies, bats, and hummingbirds are demonstrably downward. For most pollinator species, however, the paucity of lon - term population data and the incomplete knowledge of even basic taxonomy and ecology make definitive assessment of status exceedingly difficult.**

- Cause of Decline: The causes of decline among wild pollinators vary by species but are generally difficult to assign definitively. Pathogens that have spilled over from commercially produced bumble bees for greenhouse pollination appear to have contributed to declines in some native bumble bees. Other factors for which there is convincing evidence include habitat degradation and loss, particularly for some bats, bees, and butterflies.

- *Status of Pollinators in North America (2007). The National Academies Press*

Millions of hives in the U.S.



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Wild Pollinators

- **Consequences of Decline: The consequences of pollinator decline in nonagricultural systems are more difficult to define, but one important result could be an increased vulnerability of some plant species to extinction.**

- Monitoring: Long-term, systematic monitoring is necessary for unambiguous documentation of trends in species abundance and richness. Such monitoring allows detection of relationships between changes in pollinator communities and the putative causes of change. Those relationships must be understood to assist in developing plans to mitigate harm or to manage species sustainably.

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WILD BEE ABUNDANCE
ACROSS THE U.S.
MEAN OF BEE ABUNDANCE
0.4
0.2
0.0
HIGH
LOW
THE UNIVERSITY OF VERMONT


MISSING
HONEY BEE

Wild Pollinators

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Wild Pollinators

- **Conservation and Restoration: Effective conservation or restoration of pollinator populations requires comprehensive knowledge of their biology, which is currently insufficient to inform the design of sustainable management and maintenance programs. However, many simple and relatively inexpensive practices for pollinator conservation are available. Land managers and landowners, including farmers and homeowners, should be encouraged to adopt "pollinator friendly" practices, many of which incur little expense. However, widespread adoption of these practices is unlikely unless there is a general appreciation of the ecological and economic benefits of pollinators. Hence, public outreach is key to pollinator protection, conservation, and restoration.**

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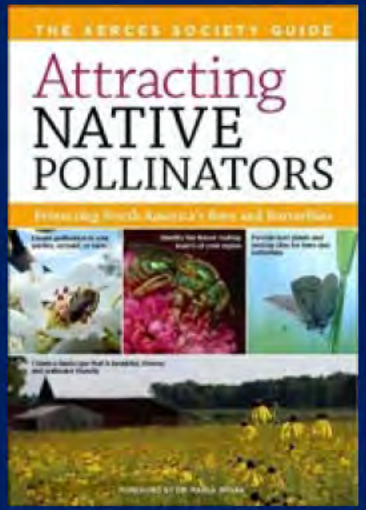
Pollinator
Habitat


Invertebrate Conservation Guidelines
Pollinator Conservation
Three Easy Steps to Help Bees and Butterflies
Bring Back the Pollinators


Pollinator Conservation:
Opportunities for Public Gardens


The Xerces Society Guide
Attracting
NATIVE
POLLINATORS


USDA
NRCS
Be a Friend to
Pollinators


PCA
Pollinator
Conservation
Association

Current Efforts: USFS-SR

- **An average of 3,500 acres of forest are thinned annually**
- Ten acres of native flowering plants are annually sown in openings to enhance pollinator habitat where it was once lacking diversity
- Since 1994, native grass plugs have been planted annually ranging from 20,000 to 130,000 plugs
- Planting practices are adjusted to encourage a diverse existing plant population

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Current Efforts: USFS-SR/SREL

- **The U.S. Forest Service-Savannah River was competitively awarded $30,000 by its regional office to effectively engage children in hand-on and sustained outdoor experiences. The University of Georgia's Savannah River Ecology Laboratory (UGA-SREL) serves as the Forest Service-Savannah River's lead partner on its Let's Grow Together initiative. This pollinator initiative will connect students to nature; provide Every Kid in a Park passes for fourth graders; enrich the STEM curriculum; reinforce the importance of sustainability; and reach students from a myriad of backgrounds.**
- Students will develop and maintain pollinator gardens and mentor younger students at afterschool programs with their gardening efforts. Additionally, a model pollinator garden will be developed at the UGA-SREL Conference Center and will serve as a potential seed source and as a demonstration for gardens.


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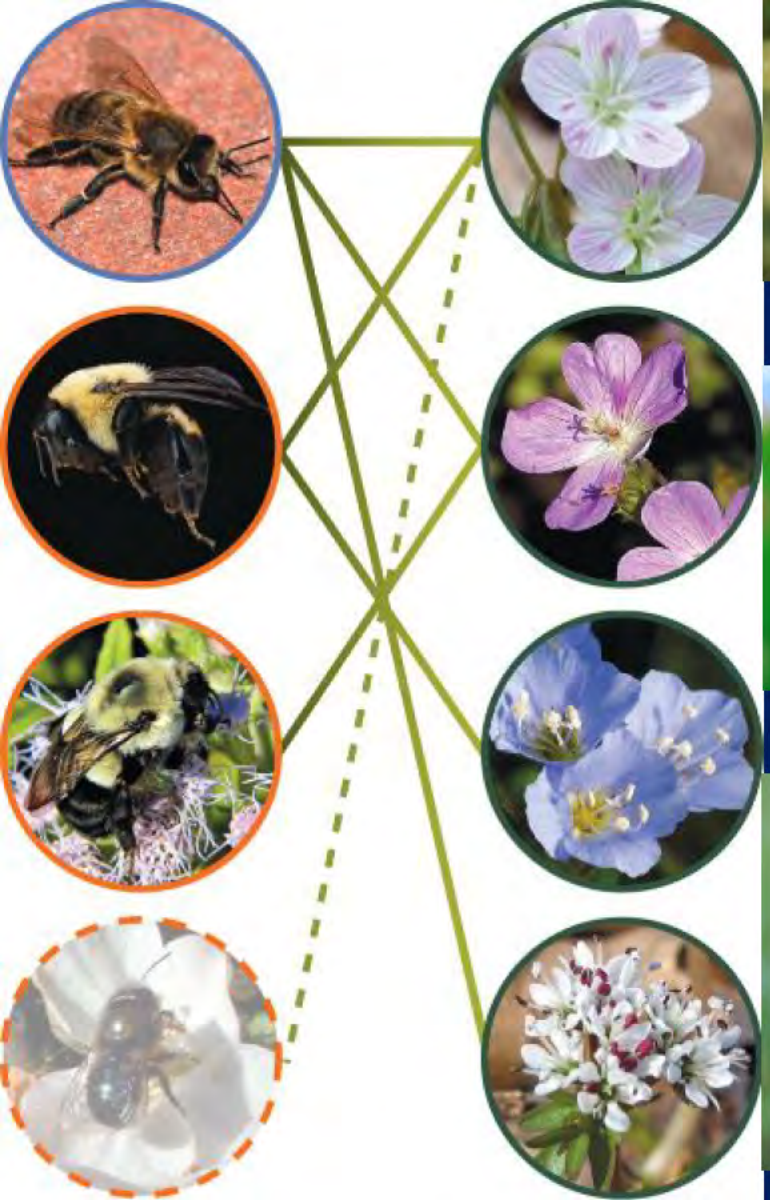
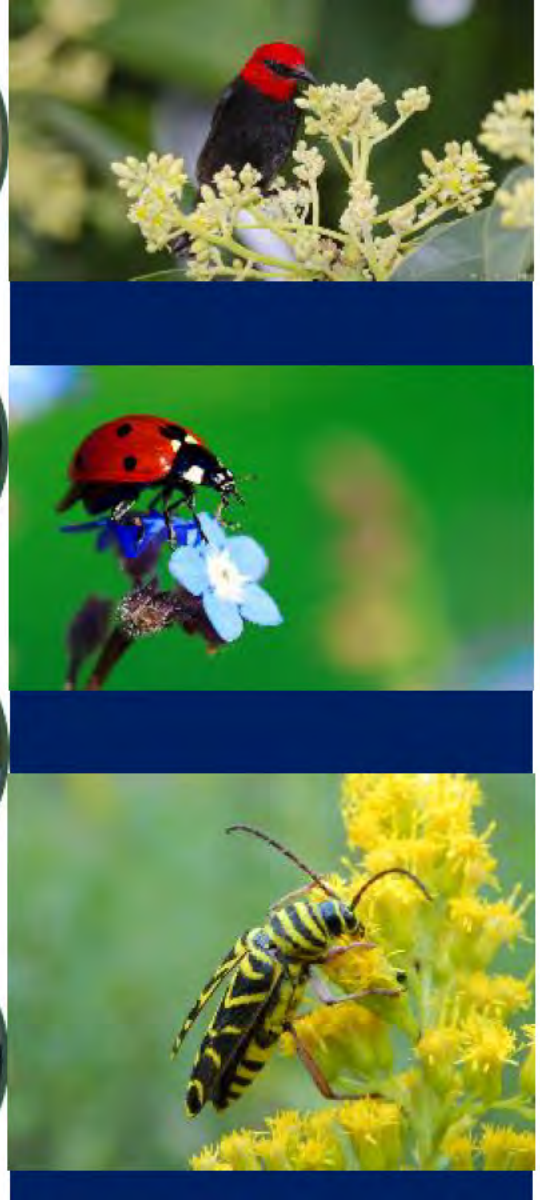
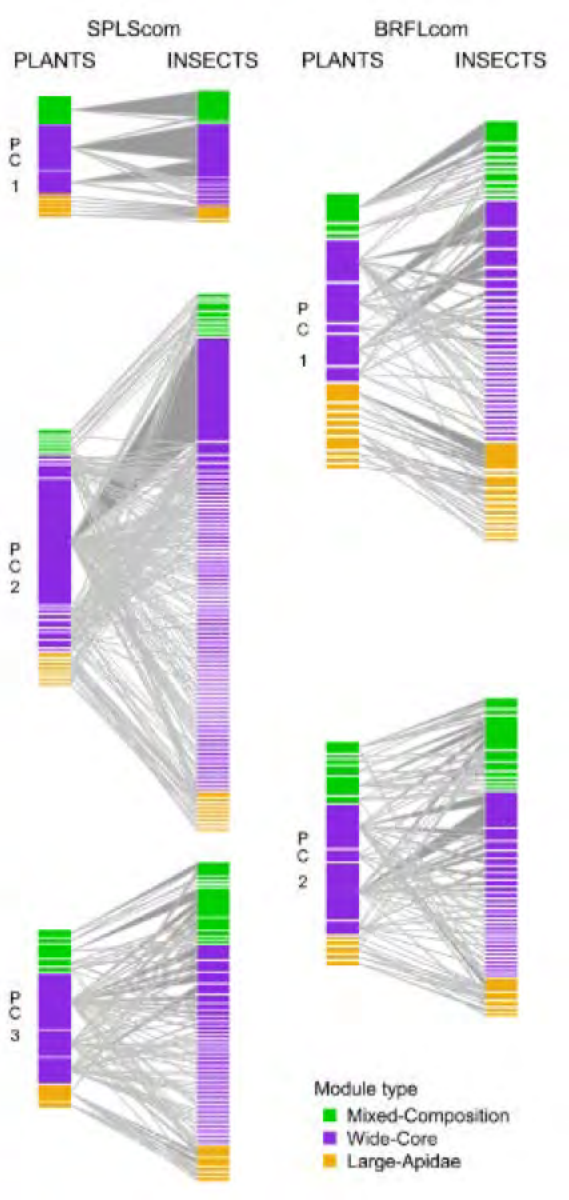
Current Efforts: Michigan State University

- Ongoing, large-scale experiment testing how the restoration of longleaf pine ecosystem in the Southeastern United States impacts insect pollinators and pollination services. Major goals include: 1) collecting and preserving pollinating insects, especially bees, across many experimental plots in the field, 2) conducting a field experiment with plants to understand how pollination services vary across the landscape, and 3) conducting observations and experiments to better understand the pollination biology of native plants in this system.






SPLScom
PLANTS
INSECTS
PC 1
PC 2
PC 3
BRFLcom
PLANTS
INSECTS
PC 1
PC 2
Module type
Mixed-Composition
Wide-Core
Large-Apidae

Proposed Research Needs

- Assessment of current value of SRS habitats to pollinators and inventory of pollinator species diversity present within those habitats.
- Assessment of value of habitat improvements to SRS habitats to pollinators and assessment of change in pollinator species diversity present within those habitats after modifications.
- Assessment of how spatial proximity of the same or different habitats influences the diversity of the pollinator community

Proposed Research Needs

- **Potential High Value Pollinator Habitats:**
  - **Red Cockaded Woodpecker Management areas**
  - **Early Stage Timber Stands**
  - **Right of Ways**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Proposed Research Needs

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  - Red Cockaded Woodpecker Management areas
  - Early Stage Timber Stands
  - Right of Ways

An unharvested, pine-hardwood forest stand in the Ouachita Mountains and four stands harvested using different methods that provide early successional forest habitat: (A) an unharvested, mature forest; (B) a groupselectionopening; (C) a single-tree selection stand; (D); a shelterwood stand and (E) a clearcut.

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- **Potential High Value Pollinator Habitats:**
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  - Early Stage Timber Stands
  - Rights of Ways

Proposed Research Needs

- **Potential Moderate Value Pollinator Habitats:**
  - **Intermediate and Mature Pine Forests**
  - **Riparian Habitats**

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  - Intermediate and Mature Pine Forests
  - Riparian Habitats

Proposed Research Needs

- **Potential Low Value Pollinator Habitats:**
  - **Existing Areas Planted in Turf Grasses (i.e., Buffers and Capped Waste Areas**
  - **Newly Remediated Sites**

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DANGER
NO ENTRY
AUTHORISED PERSONNEL ONLY
PURE
CONTRACTING

Value Added

- Increased awareness of the current and potential value of the SRS for pollinators is an activity that contributes not only to the nationwide pollinator crisis, but also to the value and mission of the SRS as a National Environmental Research Park within the DOE complex.

- At the November CAB meeting, I will be speaking about the status of the SRS as a National Environmental Research Park and at that time I will provide suggestions for increasing the value of the SRS as a NERP site.

UNIVERSITY OF GEORGIA

Savannah River Ecology Laboratory