Farmland and Pollinators
Past, Present and Future

Presented by Mace Vaughan
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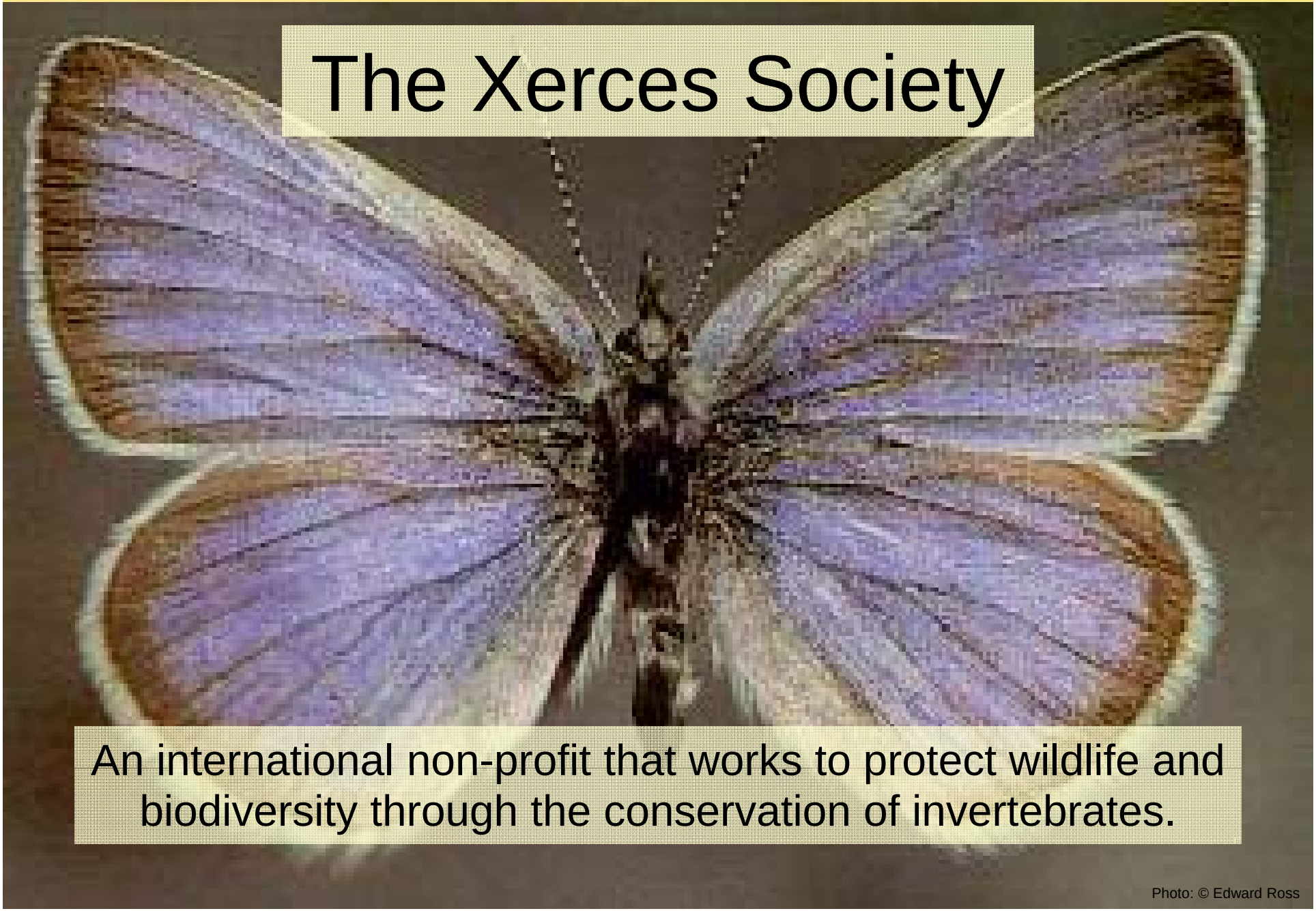
Joint Pollinator Conservation Specialist, NRCS West Nat'l Tech Support Center

Photo: Edward S. Ross

The Xerces Society



An international non-profit that works to protect wildlife and biodiversity through the conservation of invertebrates.

The Xerces Society: A Nationwide Pollinator Extension Service

Collaborating with scientists, government agencies, cooperative extension, conservation groups and farmers

- Training and outreach
- Technical publications
- Technical support to the USDA-NRCS and partners
- Applied research
- Direct technical support to farmers
- Develop new conservation tools
- Information for policymakers and media
- Document at-risk pollinators

Photo: Eric Mader

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The Past

Scale of agriculture was smaller and honey bees didn't have varroa mite and a host of diseases.

More opportunities to get pollination from wild native bees and feral honey bees.

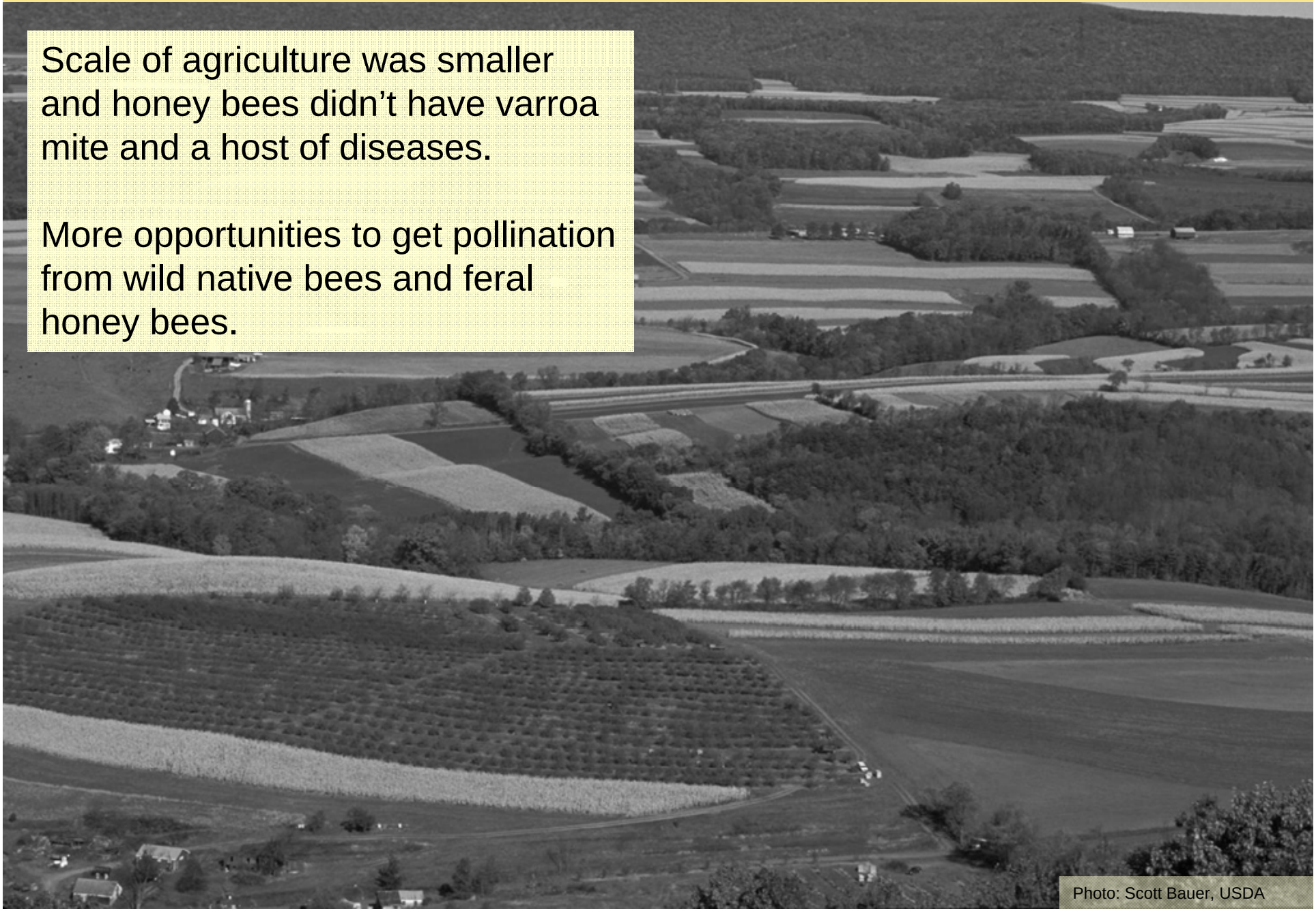

Photo: Scott Bauer, USDA

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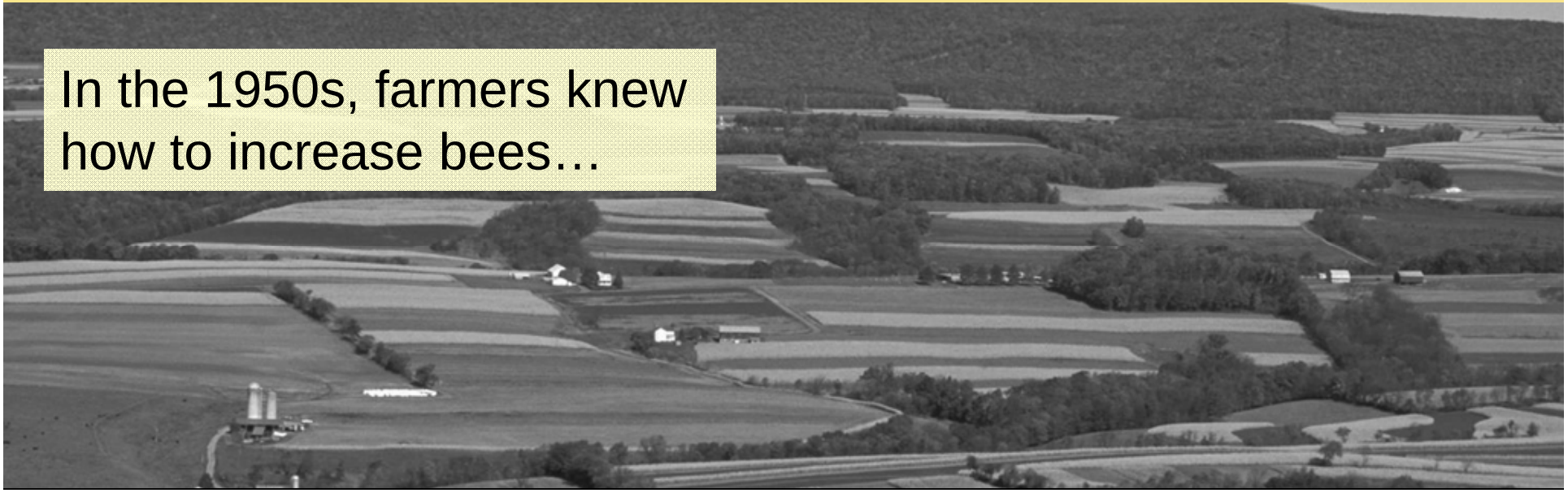
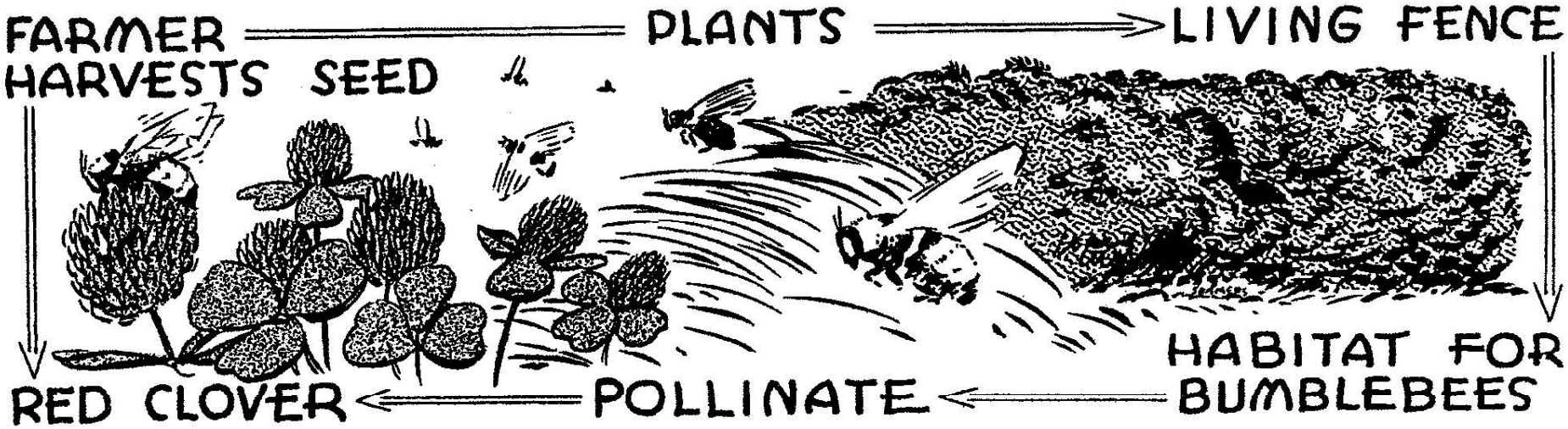
The Past



In the 1950s, farmers knew how to increase bees…



The Past

GROW MORE LEGUME SEED
With Pollinating Insects

Those busy bees you see in legume fields on warm summer days are doing much more than making honey. They are making money for the farmer who harvests legume seed.

Legume seed yields generally have been reduced to about one-fourth of what they once were. Lack of pollinating insects is the main reason. Tests show that you can increase seed yields 3 to 15 times if you have enough bees.

Legume seeds are badly needed for meadow seedings in soil-conserving crop rotations and pasture improvement. All of the following legumes are greatly benefited by insect pollination:

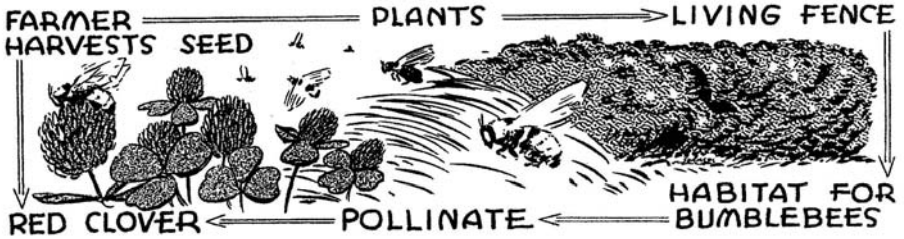
Alfalfa	Ladino clover	Sweetclover	Birdsfoot trefoil
Alsike clover	Red clover	White clover	Hairy vetch

WILD BEES ARE GOOD POLLINATORS

Years ago wild bees did most of the pollinating. But intensive cropping, cleaning up of fence rows, and uncontrolled burning have destroyed their homes and greatly reduced their number. Wild bees are the most efficient pollinators, especially for alfalfa.

You can increase the number of wild bees on your farm by protecting the following kinds of land from grazing and burning:

Drainage ditch banks	Pond areas
Fence rows	Shelterbelts and windbreaks
Field borders	Streambanks
Odd areas	Wood lots



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service, Upper Mississippi Region, Milwaukee, Wis.

PA–126

Issued June 1950

The Present

Today's ag is full grown and facing a host of outside pressure…

Consumers demanding cheap food and farmers are under intense pressure to tighten margins.

Photo: USDA-ARS/Peggy Greb

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The Present

Today's ag is full grown and facing a host of outside pressures…

Honey bees face unprecedented demand. Worldwide insect pollinated crops are growing faster (300%) than the number of managed honey bee colonies (45%).

Photo: Bill Settle

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The Present

There is a rapidly growing body of research on the role of native bees and bee habitat in agricultural production.

Photo: Mace Vaughan

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The Present

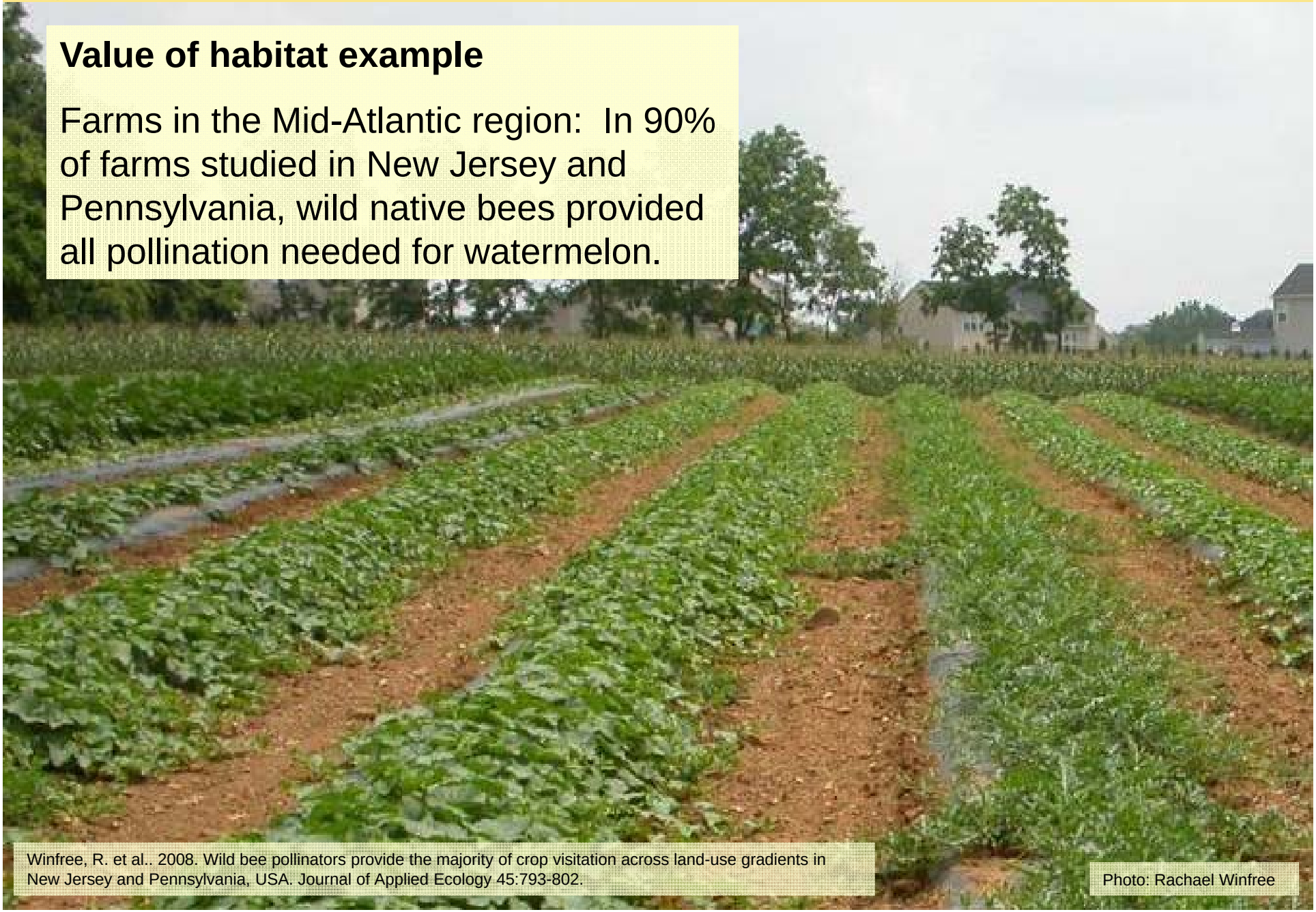
Even in today's modern agriculture, wild pollinators are providing service to help guarantee productive fields.

Photo: Bob Hammond, Colorado State University

The Present

Value of habitat example

Farms in the Mid-Atlantic region: In 90% of farms studied in New Jersey and Pennsylvania, wild native bees provided all pollination needed for watermelon.



Winfree, R. et al.. 2008. Wild bee pollinators provide the majority of crop visitation across land-use gradients in New Jersey and Pennsylvania, USA. Journal of Applied Ecology 45:793-802.

Photo: Rachael Winfree

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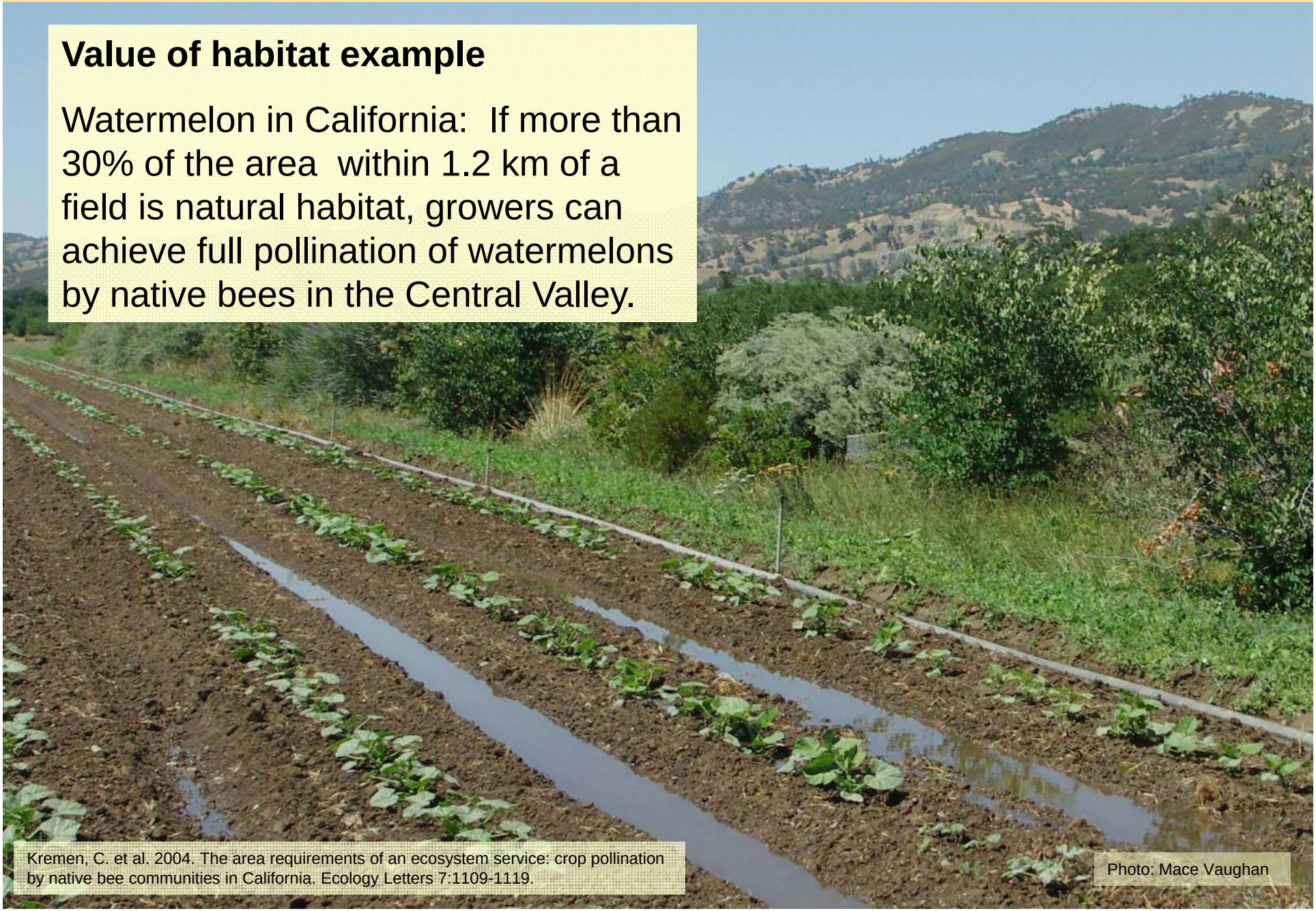
Why pollinators: Native bees in agriculture

Value of habitat example

Watermelon in California: If more than 30% of the area within 1.2 km of a field is natural habitat, growers can achieve full pollination of watermelons by native bees in the Central Valley.



Kremen, C. et al. 2004. The area requirements of an ecosystem service: crop pollination by native bee communities in California. Ecology Letters 7:1109-1119.

Photo: Mace Vaughan

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The Present

Photo: Rufus Isaacs, Michigan State Univ

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The Present

Photos: Mace Vaughan

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The Present

Photo: Hannah Gaines

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The Present

Photo: Steve Javorek, Agriculture Canada

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The Present

Photo: Sarah Greenleaf

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Increasing wild bee abundance

Photo: Rollin Coville

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Honey bee hive health

Mace Vaughan (Xerces Society)

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Support other managed bees

Mace Vaughan (Xerces Society)

The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Crop productivity

Photo: Lynn Betts, USDA NRCS

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Pest management

Photo: Elise Fog (http://enlightenedbugs.com/)

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Pest management

Photo: Mace Vaughan

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Clean air and water

Photo: Mace Vaughan

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Clean air and water

Photo: John Anderson, Hedgerow Farms

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Habitat for gamebirds and other wildlife

Photo: USDA-NRCS

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The Future

Reintegrating agriculture and ecology. Pollinator conservation provides a framework to help fulfill this goal.

- Beautiful rural communities

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The Future

Xerces and NRCS are leaders in providing the technical expertise to get habitat on the ground.

- Trainings and consulting

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The Future

Collaboration of Xerces, NRCS, farmers, and other partners has resulted in1000s of acres being planted or managed for pollinators across the United States.

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The Future

…and demonstrations and field trials from Maine to Florida to Oregon

BEE FRIENDLY FARMING®

Photo: Joe Williams, NRCS

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The Future: Technical Support

- Xerces Society publications
- www.xerces.org

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The Future: Technical Support

Pollinator Conservation Resource Center

Region-specific information from Extension, NRCS, NGO, and other sources, including:

- Plant Lists
- Nest Construction Guidelines
- Conservation Guidelines
- Pesticide Guidelines
- Sources of Plant Materials

www.xerces.org/pollinator-resource-center

A collaboration with Neal Williams and Katharina Ullmann (UC Davis) and NE SARE

What's old is what's new

In 1936, Dr. Patch predicted that by the year 2000

…the President of the United States would issue a proclamation claiming that land areas at regular intervals throughout the U.S. would be maintained as "Insect Gardens," under the direction of government entomologists. These would be planted with milkweed, hawthorn, and other plants that could sustain populations of butterflies and bees. She predicted that some time in the future, "Entomologists will be as much or more concerned with the conservation and preservation of beneficial insect life as they are now with the destruction of injurious insects."

Dr. Edith Patch (1916)
Professor of Entomology, University of Maine

Photo:The Friends of Edith Patch (www.edithpatch.org)