Wetlands & Pollinators: How water quality practices can benefit pollinators

Rae Powers

Farm Bill Pollinator Conservation Planner and

NRCS Partner Biologist

Nebraska and South Dakota

Sarah Nizzi

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Iowa

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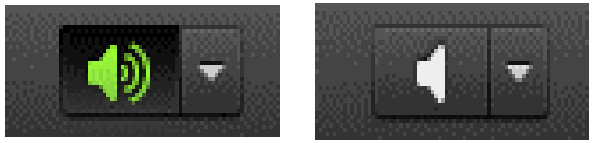
Photo: Kitty Bolte/Xerces

Logistics

Computer Speaker Status



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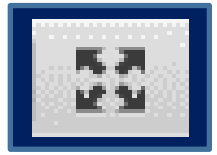
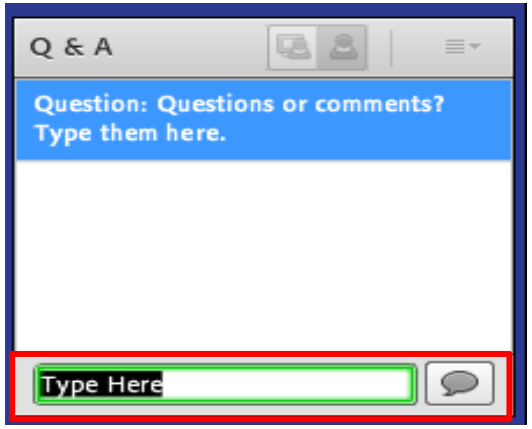
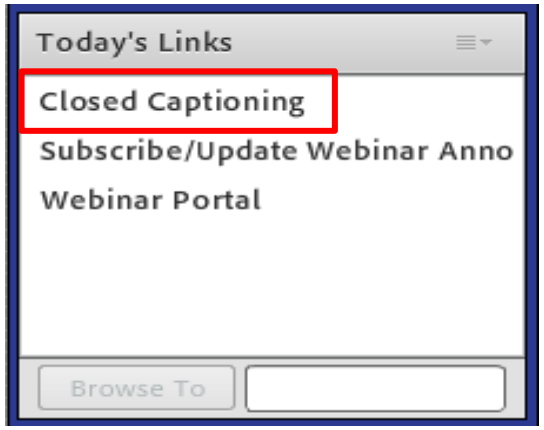


Q&A Pod



Today's Links



Today's Handouts

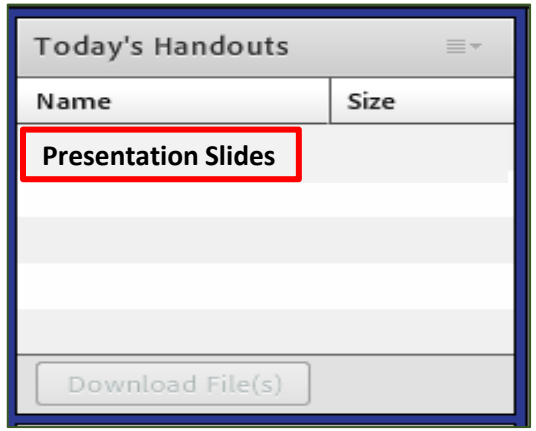


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Photo: Kitty Bolte/Xerces

On the Ground Conservation

Pollinators **Agricultural Biodiversity** **Endangered Species** **Aquatic Invertebrates** **Pesticides** **Urban Conservation**

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Eric Mader
Port Townsend, WA
Sara Morris, Corin Pease, Liz Robertson,
Mace Vaughan, Jillian Vento-Feldman
Portland, OR
Sarah Hamilton-Buxton
Bismarck, ND
Sarah Foltz Jordan
Duluth, MN
Hannah Mullally
Bangor, ME
Karin Jokela
Farmington, MN
Alina Harris
Dover, NH
Jennifer Hopwood
Omaha, NE
Sarah Nizzi
Adel, IA
Emily May
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Jessa Kay Cruz, Anna Murray
Sacramento, CA
Rae Powers
Lincoln, NE
Stephanie Frischie
Otterbein, IN
Kelly Gill
Columbus, NJ
DeeDee Soto
Merced, CA
Kaitlin Haase
Santa Fe, NM
Ray Moranz
Stillwater, OK
Nancy Lee Adamson
Greensboro, NC
Cameron Newell
Chula Vista, CA
Xerces Pollinator
Program Team Office
Locations

syrphid fly (aka hover or flower fly) adult eating black willow, *Salix nigra,* pollen and maybe nectar

Photo: Nancy Lee Adamson

Roadmap

Wetland basics
Pollinator basics

Wetland plants for pollinators – resources
Pollinators on wetlands stories
Wetland management
Pesticide protection

USDA NRCS Conservation Practices for Wetlands

Case studies

Additional Resources

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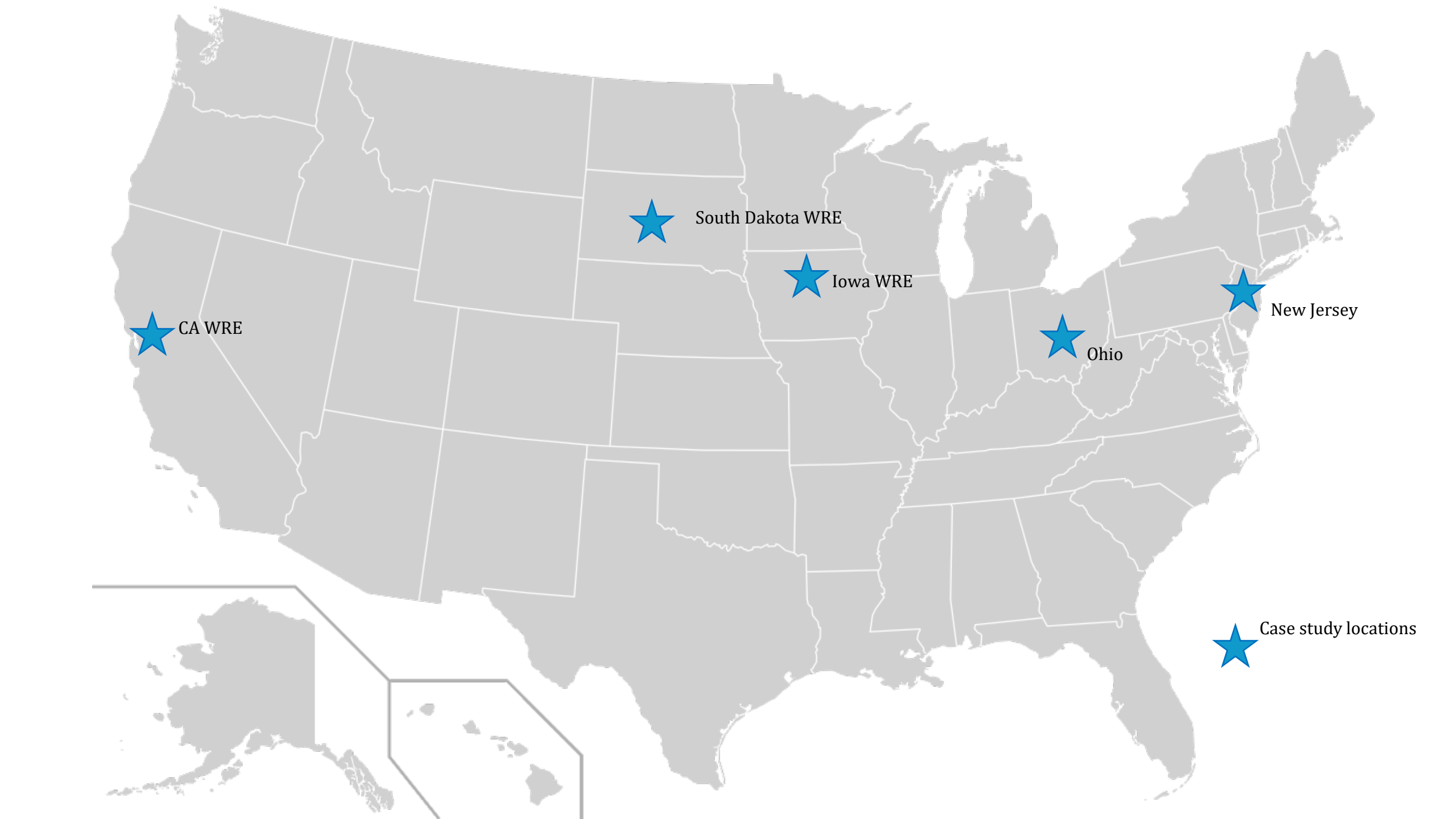
South Dakota WRE
Iowa WRE
CA WRE
New Jersey
Ohio
Case study locations

Photo: Sarah Nizzi

Wetlands

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. . .

<u>Wetlands must have one or more of the following three attributes:</u>

1) at least periodically, the land supports predominantly hydrophytes
2) the substrate is predominantly undrained hydric soil

3) the substrate is saturated with water or covered by shallow water at some time during the growing season of each year.

Cowardin et al 1979

Diversity of Wetland Types

Photos: Jessica Abernathy-Callahan; USDA-FL-NRCS, Flickr; Rich Hatfield; Sarah Nizzi

Benefits of wetlands

Flood mitigation	Water quality	Recreation	Stream flow moderation




Photos: Chris Helzer/The Nature Conservancy

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Fish & wildlife habitat

Photo: Chris Helzer/The Nature Conservancy

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Wetland decline

54-57% global loss of wetlands but may be as high as 87% loss of natural wetlands since 1700s (Davidson 2014)

Few studies of loss of ephemeral wetlands or intermittently flooded wetlands and some major flooded forest areas

Doesn’t measure degradation of wetlands that affects quality or function

Many ongoing threats to wetlands

Photos: top Jerry Rodrigues, USFWS, Medicine Lake NWR; Ann Tihansky, USGS

Declining Insect Diversity and Abundance

An increasing number of studies are showing declines in insects around the world.

Hallmann et al. 2017, Lister and Garcia 2018 Sánchez-Bayo and Wyckhuys 2019. Thomas et al. 2019, Saunders 2019; Forister et al. 2019

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Main Groups of Insect Pollinators:
Bees & wasps, flies, butterflies & moths, beetles

Photos: Nancy Lee Adamson

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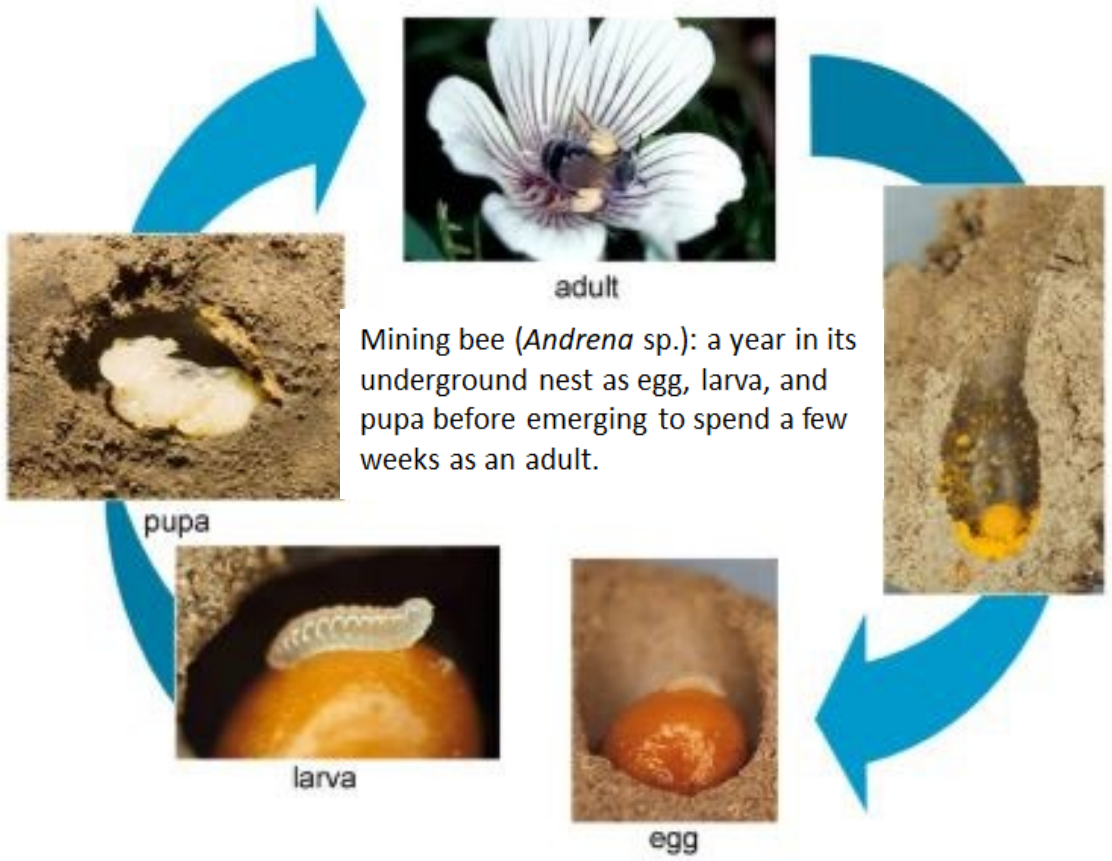
Wild Bee Diversity

- Worldwide Distribution: 20,000 species
- North America: 5,200 species
- United States: 3,600 species

Photos: Sam Droege

Solitary Bee Life Cycle



Annual Life Cycle

- Adults live 3 to 4 weeks
- Single female per nest
- No workers to provision the nest
- Adults emerge to feed and mate

Illustation: Xerces Society; All photographs in this illustration are by Dennis Briggs, except the photograph of the pupa, which is by Robbin Thorp.

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Habitat is Key

Habitat Provides:

Food

Nesting and overwintering sites

Protection from pesticides

Photo: Kelly Gill/Xerces

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Habitat through the growing season—native trees, shrubs, wildflowers & grasses

Pollinators, predators, & parasitoids need food (nectar, pollen, or prey)

Photos: Wild indigo by Christine Taliga, buttonbush and goldenrod by Dennis Burnette, others by Nancy Lee Adamson

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Many native bees are pollen specialists

They collect pollen only from one species, genus, or family

- asters (various genera)
- *Cirsium,* native thistles
- *Chrysopsis,* goldenaster
- *Cucurbita,* squash
- *Helianthus, s*unflowers
- *Hibiscus,* rose mallow
- *Ipomoea*, wild potato vine
- *Oenothera,* primroses
- *Physalis*, ground cherry
- *Pityopsis*, silkgrass
- *Salix,* willows
- *Strophostyles*, fuzzy bean
- *Vaccinium*, blueberry
- *Vernonia,* ironweed
- *Viola*, violet

…many more

Photos: Nancy Adamson/Xerces, Annette Meredith

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Host plants for butterflies and moths

Photos: Nancy Lee Adamson

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~70% of Native Bees Nest Underground

- Resemble ant-nests from above ground
- Nest chambers are lined with waxy glandular secretions, and can sometimes even resist flooding
- Sunflower bees, miner bees, long-horned bees, sweat bees

Photos: Eric Lee-Mader, Rollin Coville, Dennis Briggs

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~30% of Native Bees are Tunnel Nesting

Photo: Sarah Foltz Jordan/Xerces Society

- Hollow stems, beetle borer holes
- Nest entrances sealed with mud or leaf pieces
- Conserve stumps and dead logs

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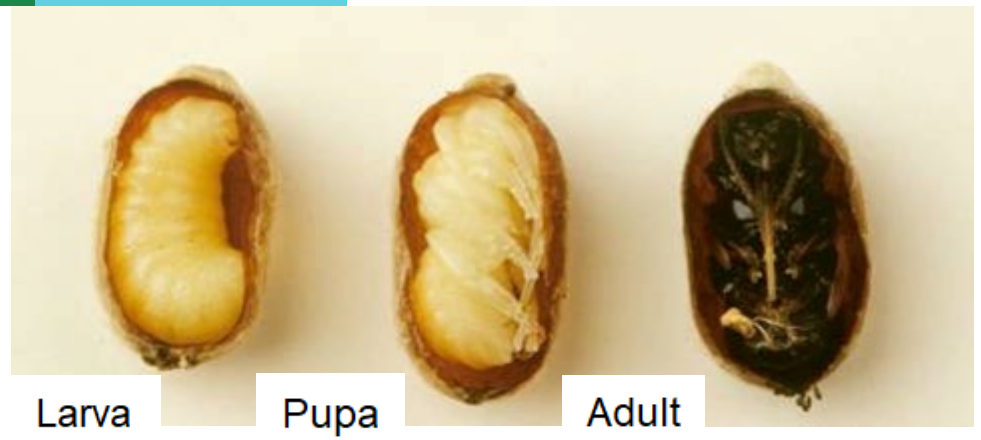
Inside the Nest

Cross-section of silk cocoons



Silk cocoons with dormant bees inside

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Photos: USA-ARS, Eric Lee-Mader

Bumble Bees (Social)

46 species in North America

Social colonies founded by single queen

Annual, last only one season

Nest may contain 25 - 500 workers

Nests in abandoned rodent burrows, brush piles, tussocks, tree cavities

Bombus impatiens (Common Eastern bumble bee) is available for commercial use

Photos: Elaine Evans; Xerces Society/Eric Lee-Mader

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Habitat provides shelter and egg-laying sites

Brush piles, rock piles, woody and pithy stems, leaf litter, undisturbed ground






Photos (clockwise from upper left): Thelma Heidel-Baker, Sarah Foltz Jordan, Sarah Foltz Jordan, Karin Jokela, Steven Severinghaus, Karin Jokela

Wetlands as pollinator habitat

Photos: copper butterfly- Candace Fallon, rest-Heather Holm

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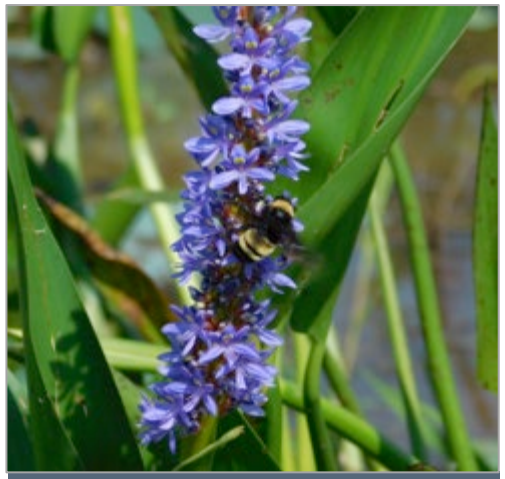
Habitat across the gradient

Associated uplands

Facultative

Facultative upland

Obligate upland



Shallow water

Floating plants

Emergent plants

Obligate wetland

Facultative wetland

Transitional

Facultative wetland

Facultative

Photos L to R: Kat Prince/Xerces, Mace Vaughan/Xerces, Heather Holm

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USDA PLANTS

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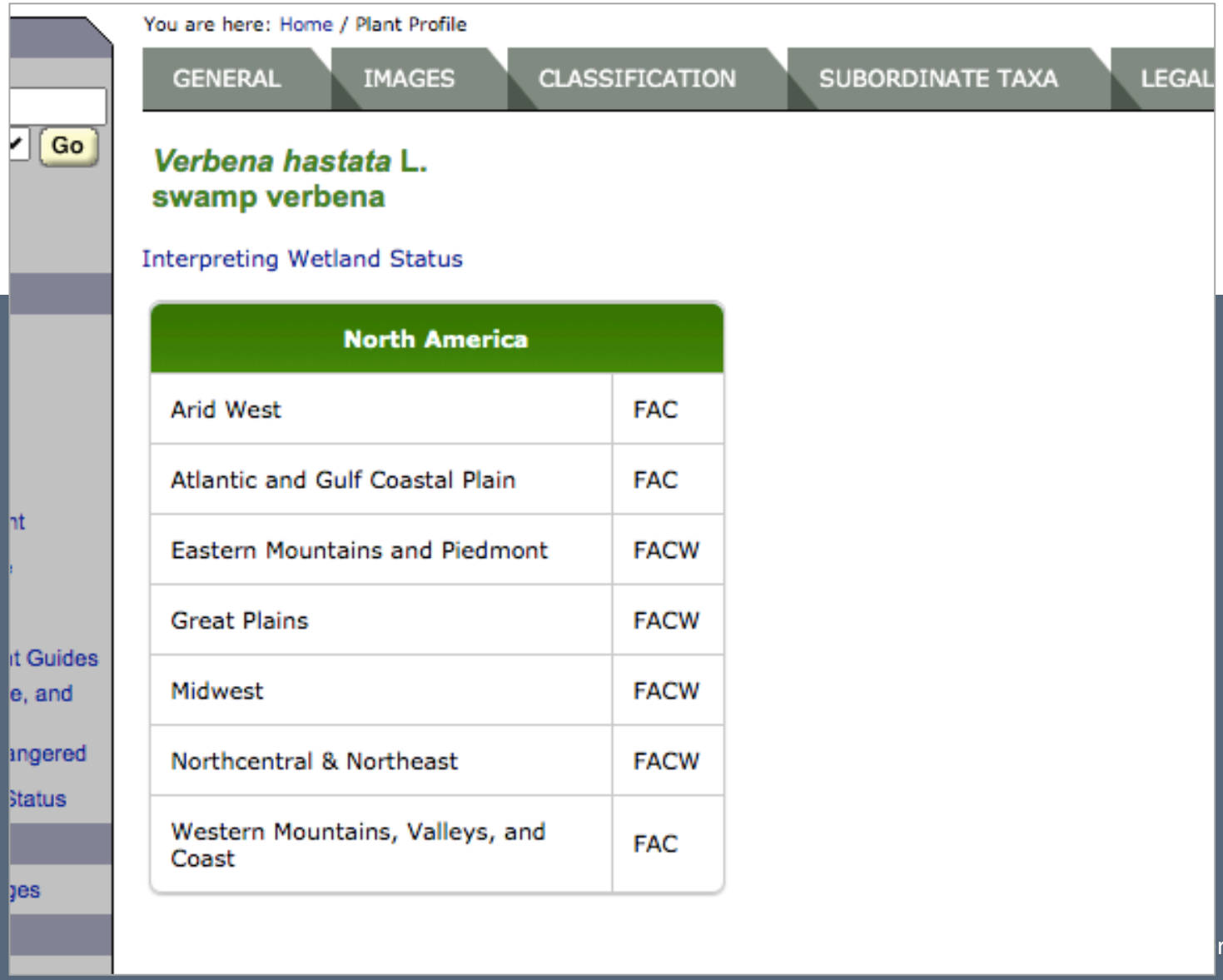
USDA PLANTS Wetland tab



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Wetland Indicator Status Search

Interpreting Wetland Indicator Status

Find National Wetland Plant List wetland indicator status for vascular plants using custom search criteria.

1. Enter Search Criteria:

Select by scientific name, symbol or common name:
Scientific Name

Select by Category:
All
Dicot
Fern
Gymnosperm

Select by Duration:
All
Annual
Biennial
Perennial

Select by Growth Habits:
All
Forb/herb
Graminoid
Shrub

Native Status:
Any Status
Native to PLANTS Floristic Area
- Native to North America
- Native to Hawaii

Select by State Distribution:
All
U.S. States
--Alabama
--Alaska

Select by Wetland Region:
All
Western Mountains, Valleys, and Coast
Hawaii
--South Pacific Islands

Select by Regional Wetland Indicator (Status):
FACW - Facultative Wetland
UPL - Obligate Upland
OBL - Obligate Wetland
TBD - To Be Determined

2. View and Sort by:

(•) Scientific Name ( ) Common Name ( ) Symbol

3. Results per page:

COE Nat'l Wetland Plant List

https://wetland-plants.sec.usace.army.mil/

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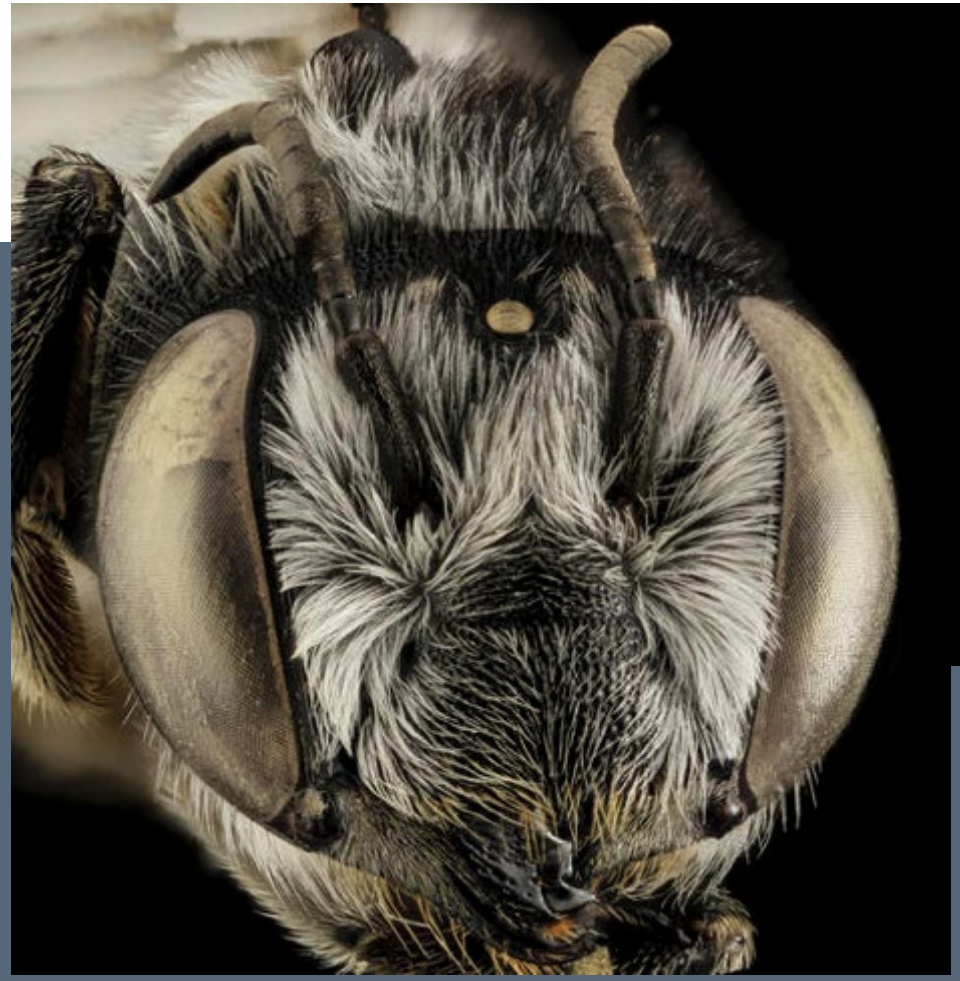
Megachile addenda



Photos: USGSBIML Team

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Coelioxys immaculata

Photos: USGSBIML Team

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Macropsis nuda on *Lysimachia ciliata*

Photo: Joel Gardner https://bugguide.net/node/956843

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Carex grayi and *Hesperia ottoe*

Photo: Prairie Moon Nursery, Tom Murray, https://bugguide.net

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Ecoregional Revegetation Application

http://www.nativerevegetation.org/era/

- Tool designed for highway plantings
- Filter by ecoregion
- Plant information
  - months of bloom
  - soil moisture
  - fertility requirements
  - salt tolerance
  - height
  - life span

- Pollinator information
  - pollinator value
  - use by pollinators - larval food, adult food, nesting resource
  - pollinator groups - native bees, bumble bees, monarchs, butterflies, moths
  - larval species - moths and butterflies

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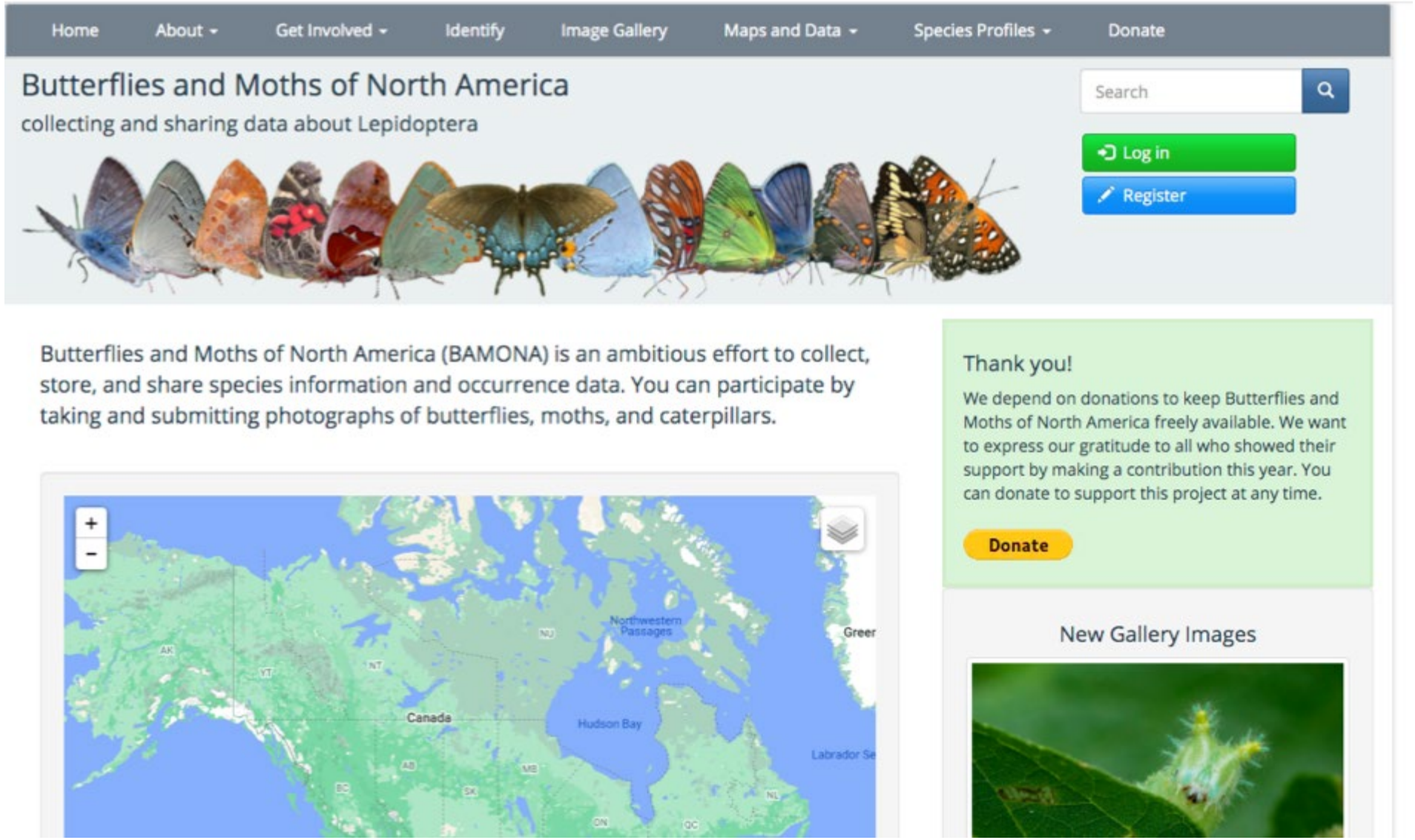
Butterflies and Moths of North America - https://www.butterfliesandmoths.org/



- Explore species data
- Create regional lists of species
- Submit data

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Photo: Ray Finocchiaro

Wetland management for pollinators

Mowing, grazing, burning, shredding, disking are common vegetation management practices

- **Be mindful of the negative impacts of management to pollinators**
- Disturb no more than 1/3 of habitat area each year (or at any given time if annual disturbance is needed)
- Brush control
- Targeted weed control for invasive or noxious weeds

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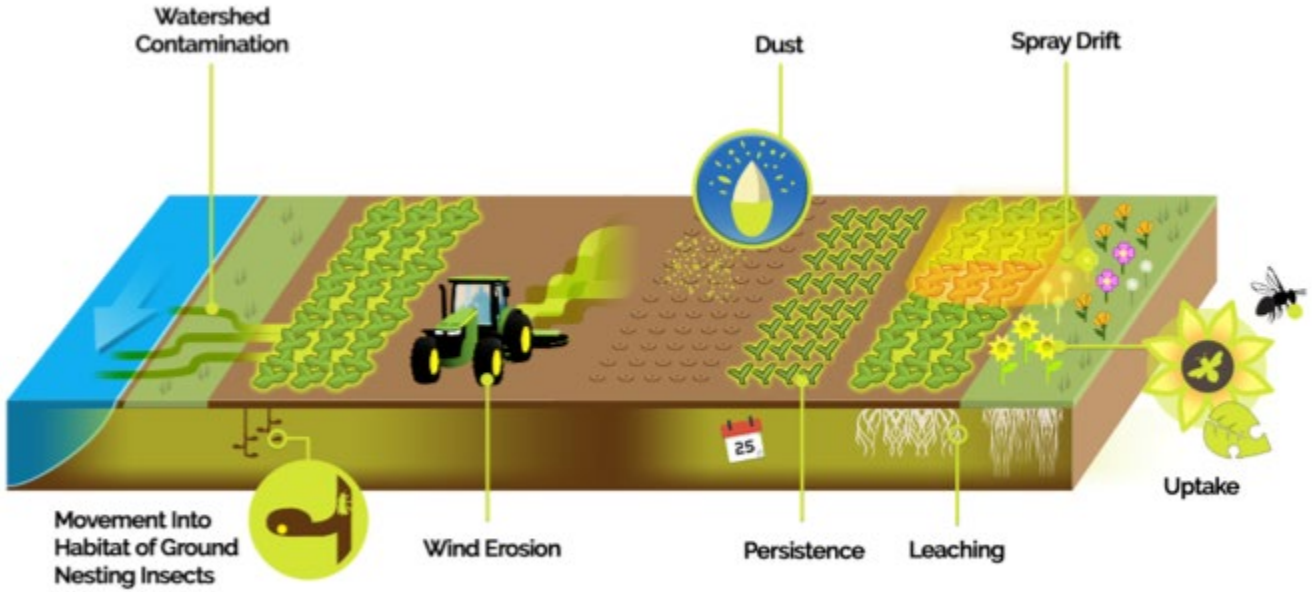
Protection from Pesticides

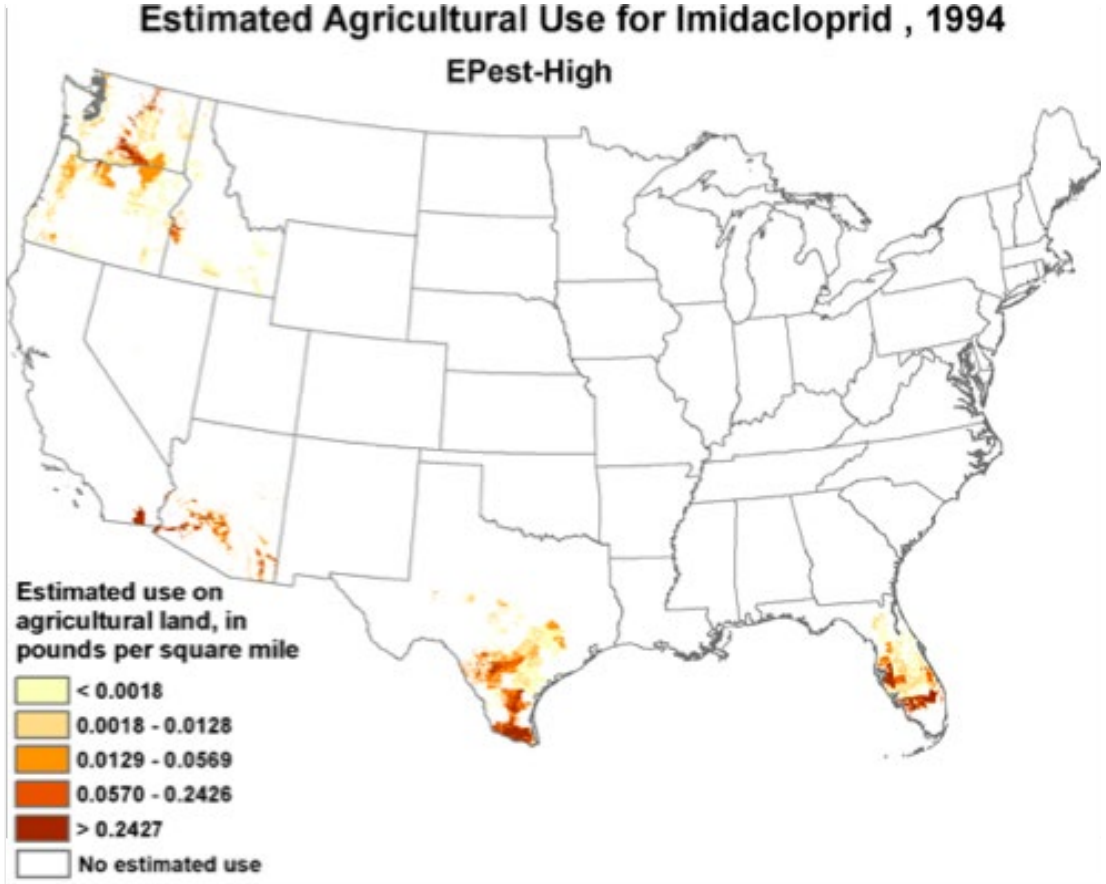
- Spray set-back
- 40 feet minimum for ground applications
- Buffers or barriers
- Avoid aerial spraying

Neonicotinoids

- Water soluble
- Can persist months to years in plants and soil
- Highly toxic to bees and many other beneficial insects
- Used prophylactically (without a demonstrated need)
- 125 ft. from neonicotinoid applications including seed treatments
  - **Persistence + Toxicity = Long-Term Exposure**



Neonicotinoids



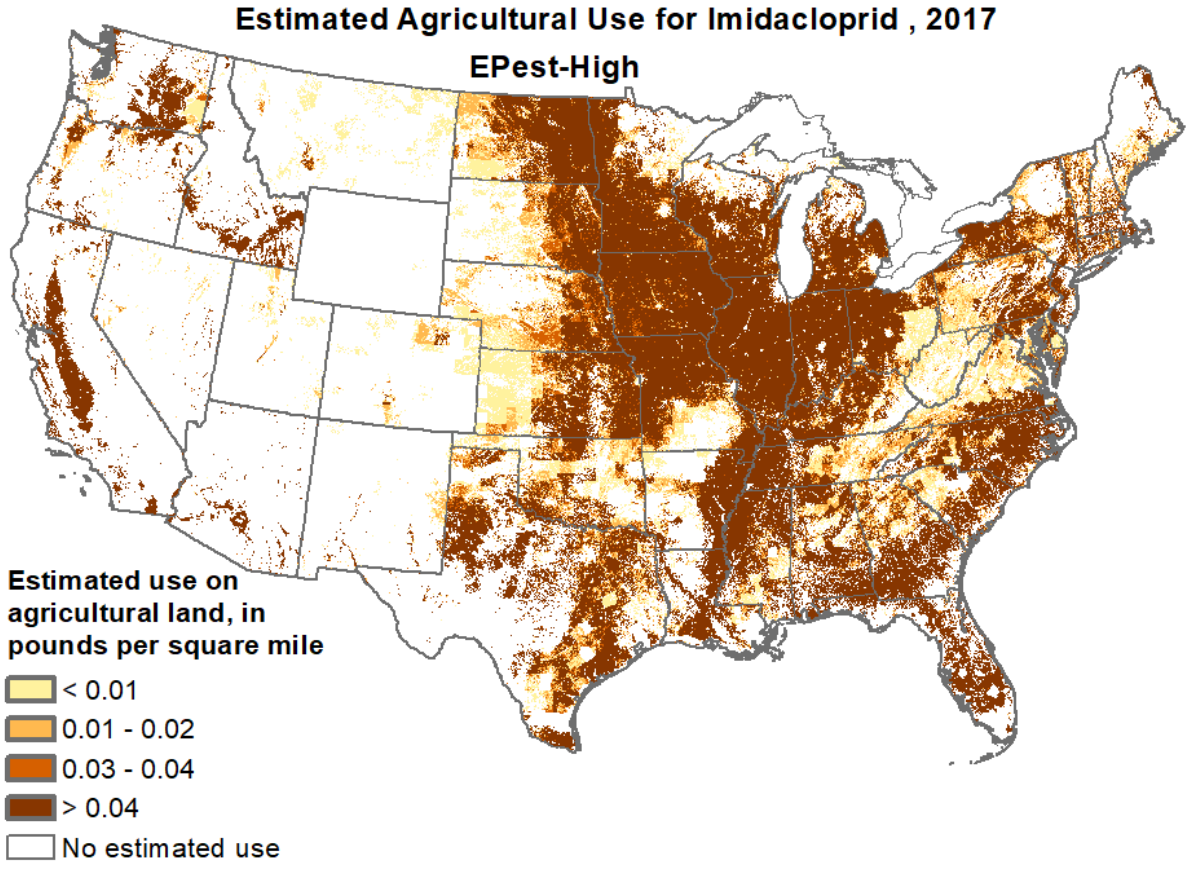


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Photo: Kat Prince/Xerces Society

Ecological Mosquito Management

- Mosquitoes are a key species in many wetland ecosystems
- Some mosquitos are pollinators!
- Management should focus on:
  - Surveillance
  - Source reduction (artificial habitat)
  - Early intervention / larviciding
  - Public outreach / personal protection

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Photo: NPS/Jacob W. Frank, Muhammad Madi Karim

Platanthera obtusata and *Aedes* mosquitos

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USDA Technical & Financial Assistance to Address Resource Concerns

USDA FSA
UNITED STATES DEPARTMENT OF AGRICULTURE • FARM SERVICE AGENCY

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Photo: IA-NRCS

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Agriculture Conservation Easement Program

ACEP-WRE

Wetland Reserve Easements

- Permanent easements
- 30 year easements
- Term contracts
- 30 year contracts

Photo: Iowa WRE, Sarah Nizzi; Iowa-NRCS

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Photos: Jessica Abernathy-Callahan (bottom); Mace Vaughn (top)

Conservation Reserve Program

Administered by the Farm Service Agency (FSA)

General sign up

Continuous sign up

Long-term contracts (10 to 15 years)

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Photo: Karin Jokela

Conservation Reserve Program (CRP)

Wetland practices that support invertebrate diversity

CP-9 Shallow Water Area for Wildlife

CP-23 & 23-A Wetland Restoration

CP-27/28 Cropped Wetland and Buffer

CP-30 Wetland Buffer

CP-31 Bottomland Timber Establishment on Wetlands

CP-39 Constructed Wetland

CP-41 Flooded Prairie Wetland

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Conservation Reserve Enhancement Program

Photo: IA-NRCS

CREP

Utilize various CRP wetland practices & others

CP9, CP22, CP23, CP23A, CP29, CP30, CP31

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Environmental Quality Incentives Program (EQIP)

644 Wetland Wildlife Habitat Management

657 Wetland Restoration

658 Wetland Creation

656 Wetland Enhancement

Bank stabilization practices

Photo: Nancy Lee Adamson

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Conservation Stewardship Program

Photo: Karin Jokela/Xerces Society

Wetland Practices

Renovate Shallow Water Habitat for Wildlife

E391C Increase riparian forest buffer width to enhance wildlife habitat

E570A Enhanced Rain Gardens for Wildlife

E580B Stream corridor bank vegetation improvement

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Contact your local USDA Service Center!

Find Your Local Service Center

We are committed to delivering USDA services to America's farmers and ranchers while taking safety measures in response to the pandemic. USDA offices are currently closed to visitors, but Service Center staff continue to work with agricultural producers via phone, email, and other digital tools. Learn more at farmers.gov/coronavirus.

USDA Service Centers are locations where you can connect with Farm Service Agency, Natural Resources Conservation Service, or Rural Development employees for your business needs. Enter your state and county below to find your local service center and agency offices. If this locator does not work in your browser, please visit offices.usda.gov.

Visit the Risk Management Agency website to find a regional or compliance office or to find an insurance agent near you.

State: - Please select -

County: - Please select -

GO

www.farmers.gov

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Case Studies!

Photo: Jean Lafitte National Park, New Orleans, LA, Sarah Nizzi

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Yolo County, California WRE

Site Prep 2017

Photos: Jessa Cruz

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Yolo County, California WRE

Spring 2018

Summer 2018

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Photos: Jessa Cruz

South Dakota WRE

Photos: Kevin Luebke, NRCS

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Winnebago County, Iowa

Photos: Brenda Tenold-Moretz, NRCS

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Hunterdon County, New Jersey

Photo: Wet meadow, Evan Madlinger, UNDA-NRCS

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Salem County, New Jersey

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Photos: Kristen Meistrells/NJ Audubon (right); Danielle Baras/NJ Audubon Society (left); Bog turtle, FWS

Urban Mitigation Site in Ohio

Photos: Google Earth

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Post Restoration

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Photos: Logan Dunn, MAD Scientists Assoc., LLC

Resources

www.xerces.org

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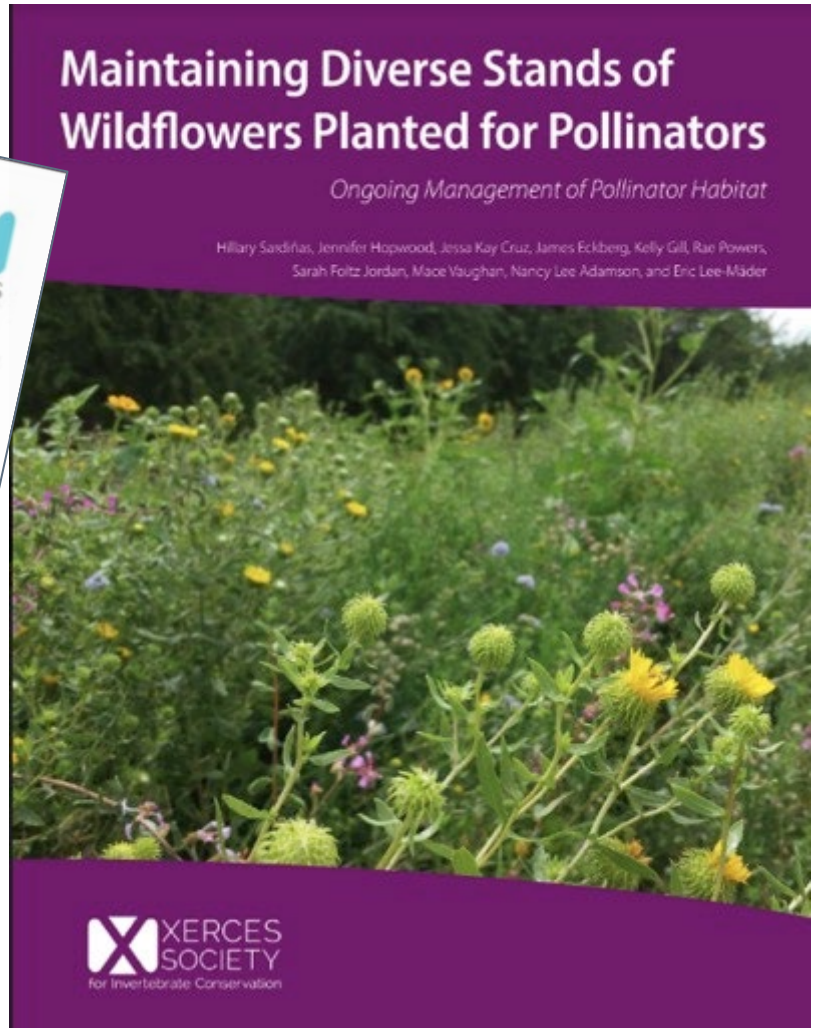
Maintaining Wildflower Stands



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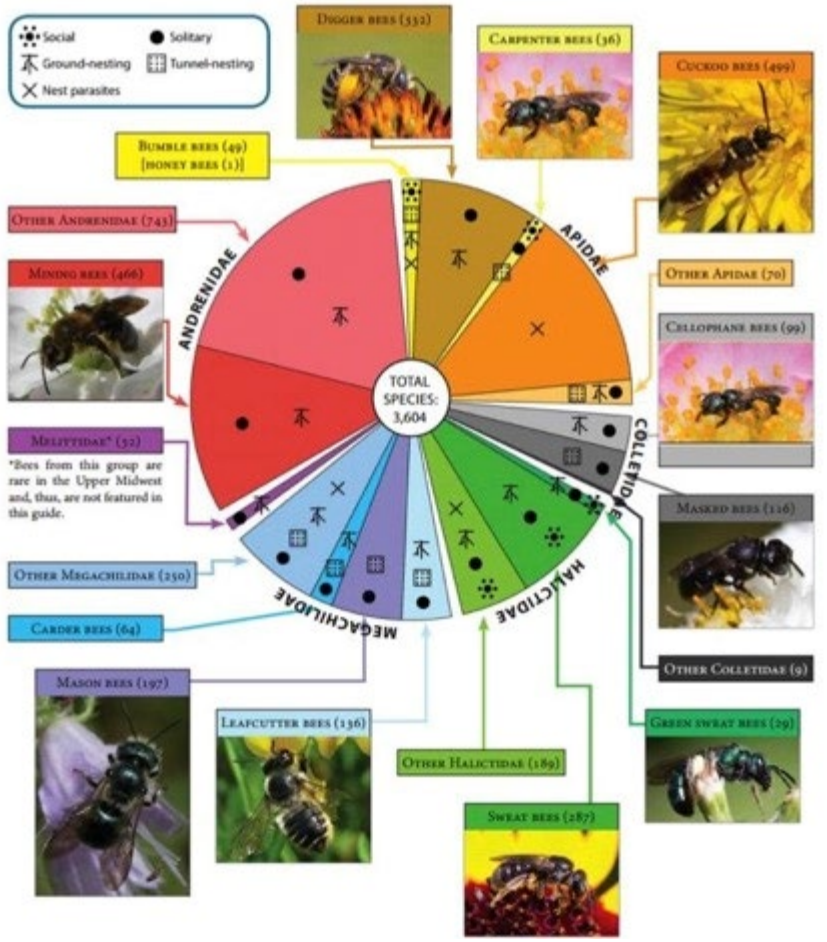
Community Science Bee Monitoring Tool

www.xerces.org



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NRCS Conservation Planners Training Webinars
with the Association of State Wetland Managers

1: Introduction to Wetlands
2: Wetlands in a Watershed/at the Landscape Scale
3: Wetland Ecology for Planners: How a Wetland Should Function
4: Wetland Ecology for Planners: Examples of Variation Across the United States
5: Dealing with Reality: How to Work with Wetlands in Altered Landscapes
6: Identifying Resource Concerns and Determining Landowner Objectives
7: How to Talk about Wetlands with Landowners
8: What are the Choices and Benefits? Matching Objectives to Programs and Getting Additional Help
9: Dealing with Challenging Weather Patterns in Wetland Restoration Planning

NRCS Conservation Planners and Partners: **AgLearn**
Public access: https://www.aswm.org/webinars-trainings

Photo: Nancy Lee Adamson

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Acknowledgements

Thank you to these Xerces Society supporters:

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Carroll Petrie Foundation

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★★★★
CHARITY NAVIGATOR
Four Star Charity

Xerces is a 501(c)(3) nonprofit and contributions are tax-deductible

Photo: Regal fritillary, Chris Helzer

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Thank you! Questions?

Email: raeann.powers@usda.gov
sarah.nizzi@xerces.org