

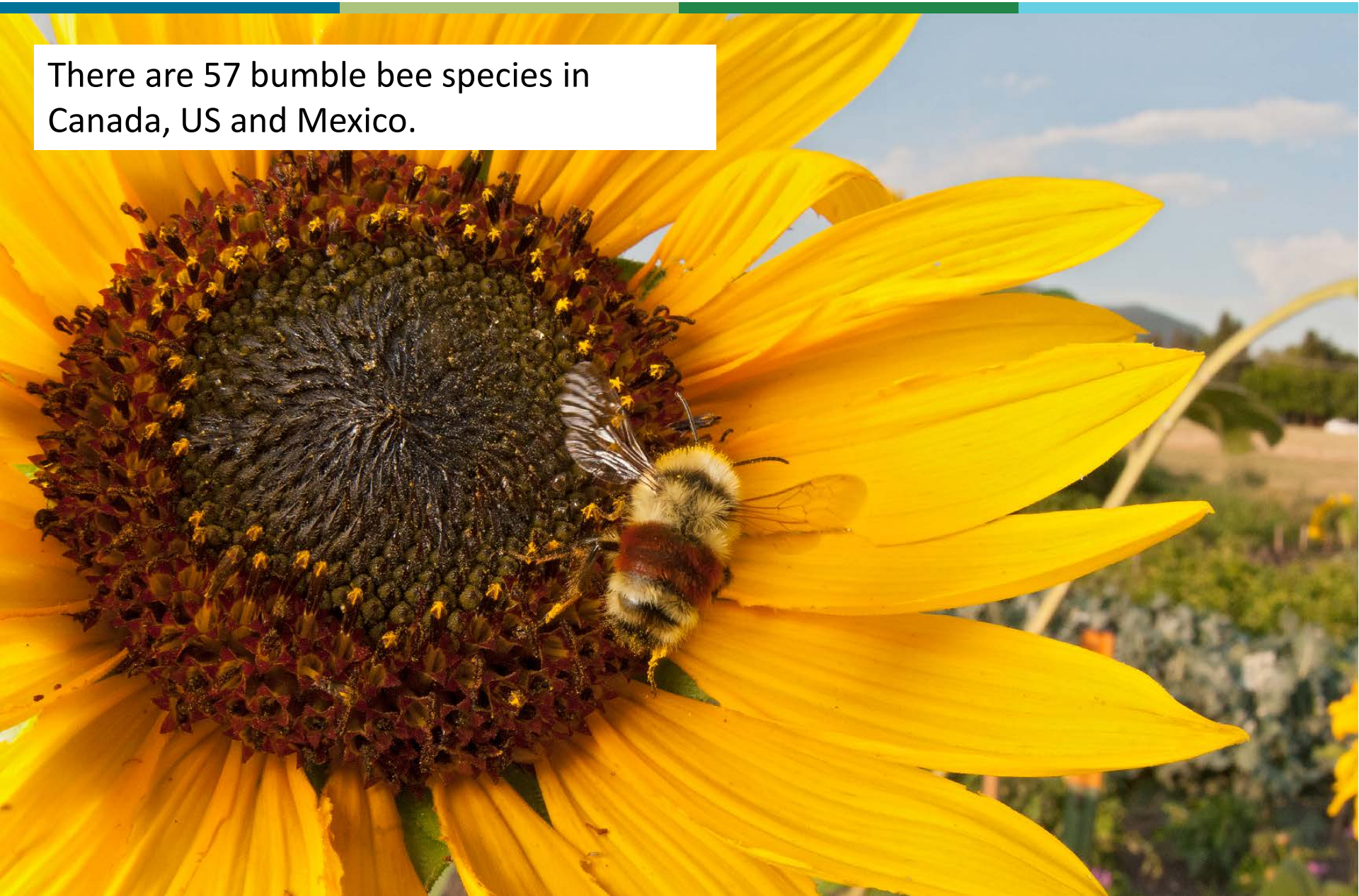
The Conservation Status of Bumble Bees of Canada, the USA, and Mexico



**Scott Hoffman Black, Rich
Hatfield, Sarina Jepsen, Sheila
Colla and Rémy Vandame**

Importance of Bumble Bees

There are 57 bumble bee species in Canada, US and Mexico.



Importance of Bumble Bees

Important pollinator of many crops.

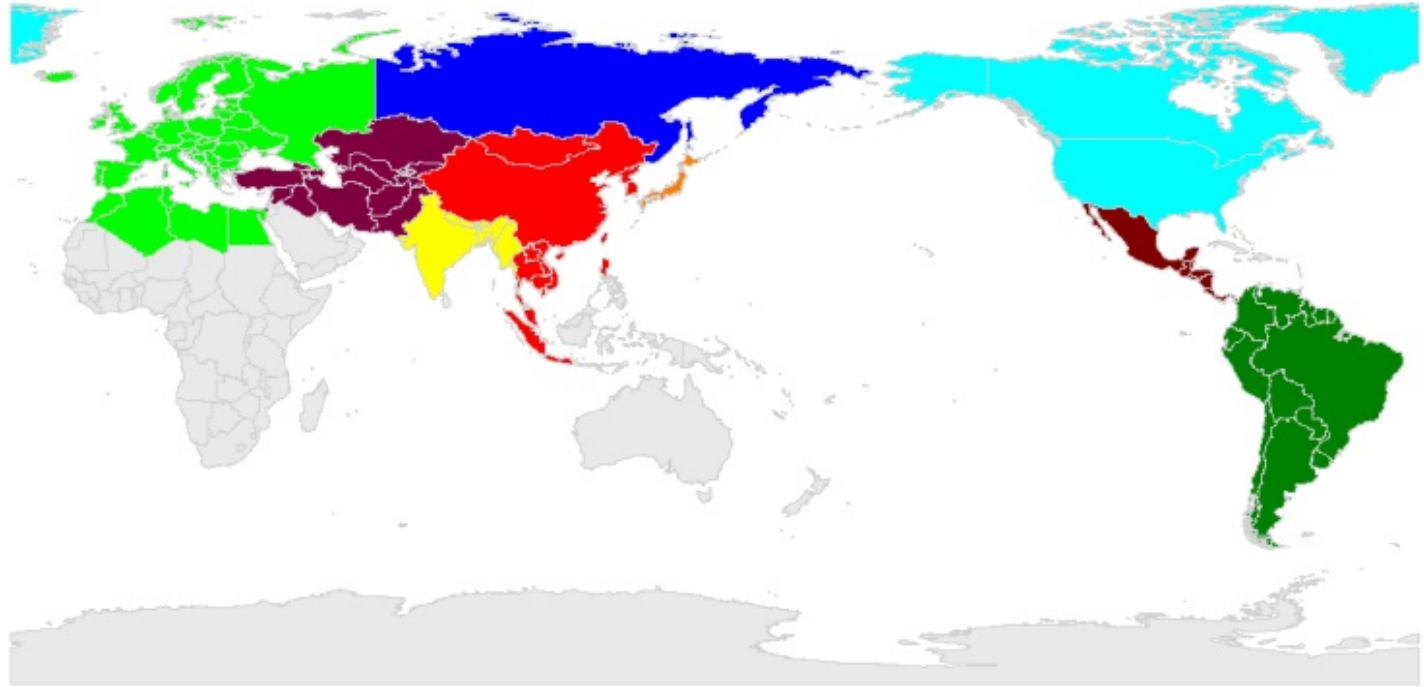


Importance of Bumble Bees

Keystone pollinator in ecosystems.



Bumble Bee Extinction Risk Assessment



Network of 75+ bumble bee experts & specialists worldwide

Goal: global bumble bee extinction risk assessment using consistent criteria



Bumble Bee Extinction Risk Assessment

IUCN Red List Criteria for Evaluating Extinction Risk

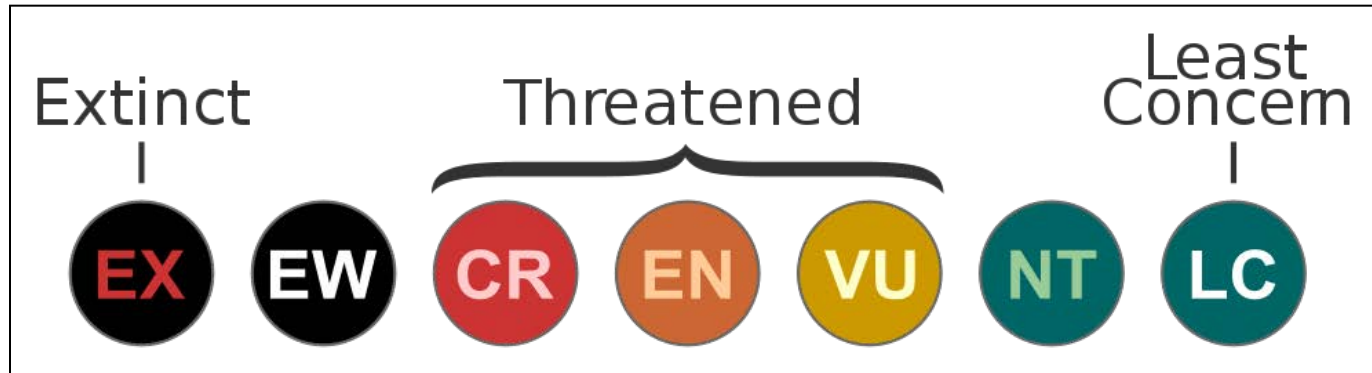
- Used a database of 250,000+ specimen records (created from multiple data providers and compiled by Leif Richardson for Bumble Bees of North America)
- Evaluate changes between recent (2002-2012) and historic (pre-2002):
 - Range (Extent of Occurrence)
 - Relative abundance
 - Persistence (50 km x 50 km grid cell occupancy)



Bumble Bee Extinction Risk Assessment

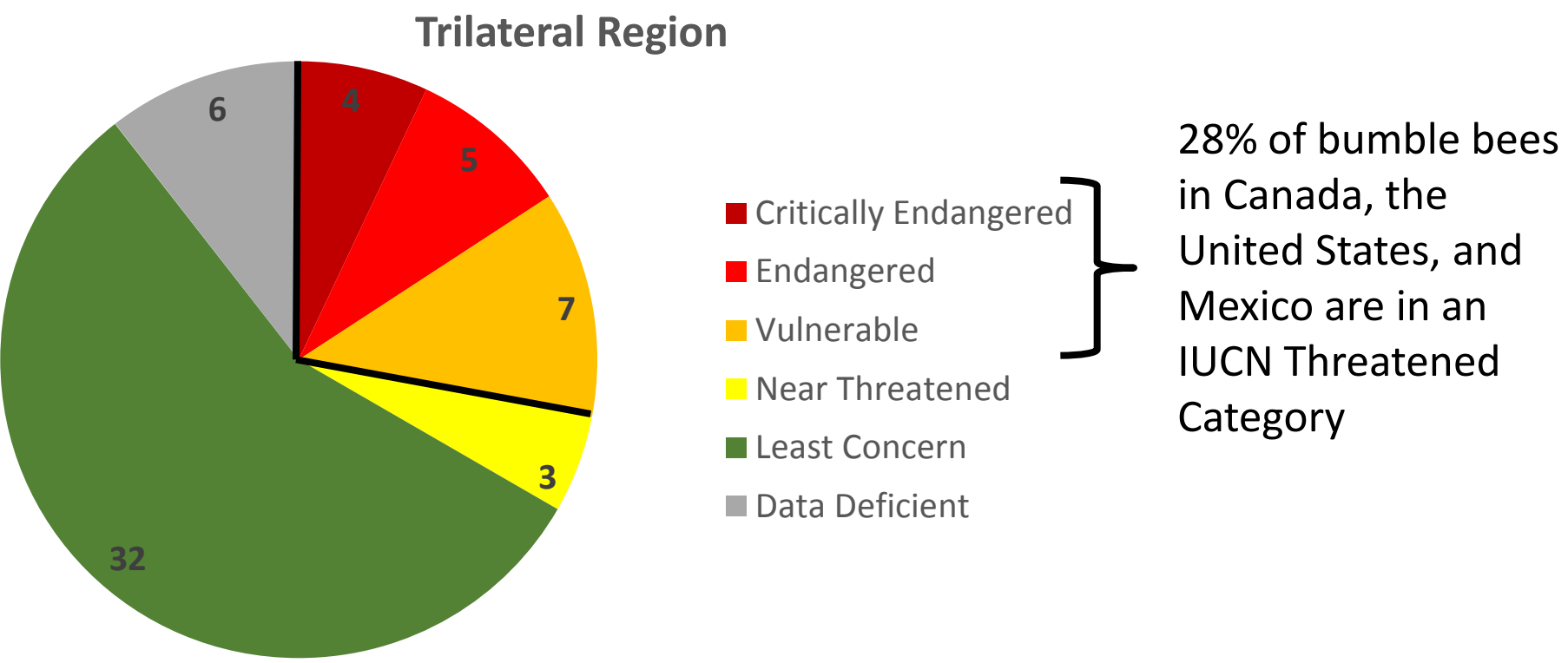
IUCN Red List Criteria for Evaluating Extinction Risk

- Analyses informed application of Red List Categories; BBSG members provided review
- This method was then adapted applied to South American and Mesoamerican bumble bees.



Sources: Hatfield et al. 2015

Bumble Bee Extinction Risk Assessment

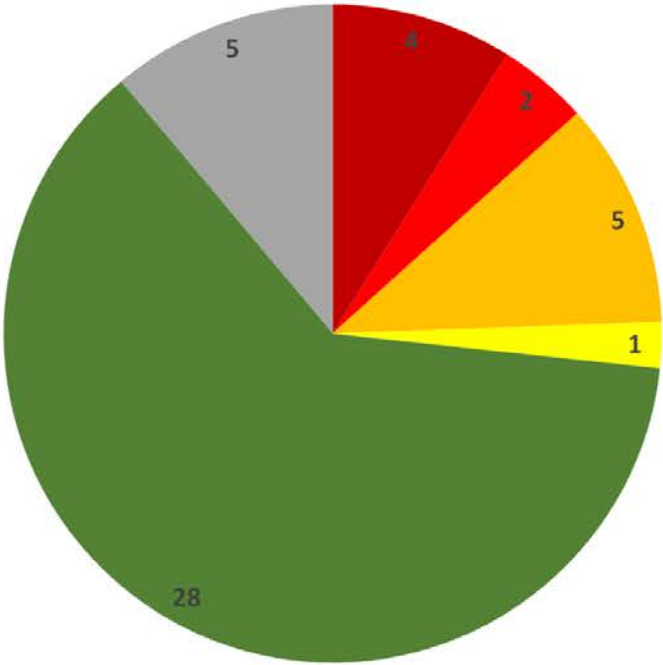


Sources: Hatfield et al. 2015

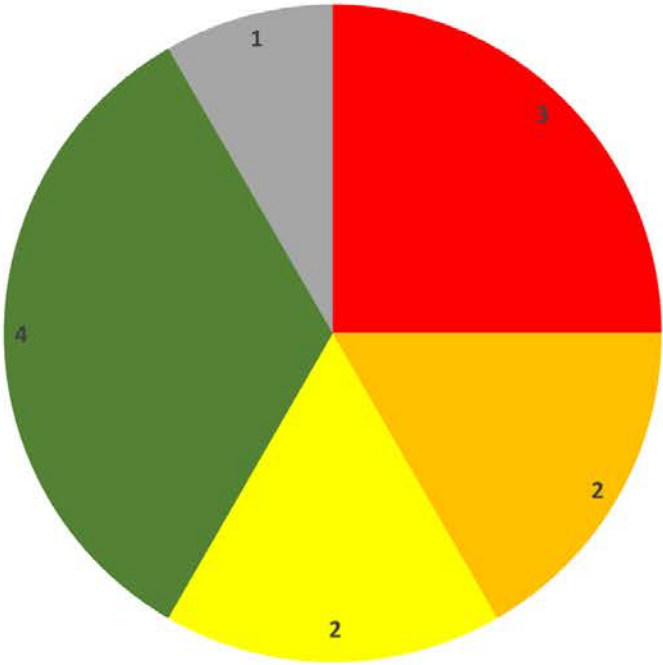


Bumble Bee Extinction Risk Assessment

Bumble Bees of Canada and the U.S.



Bumble Bees of Mexico



- Critically Endangered
- Endangered
- Vulnerable
- Near Threatened
- Least Concern
- Data Deficient

5 out of 12 bumble bees
in Mexico fall in a
Threatened Category

Sources: Hatfield et al. 2015



Bumble Bee Extinction Risk Assessment



Bombus terricola
Yellow banded bumble bee

Range loss (adjusted by collection effort): **36%**

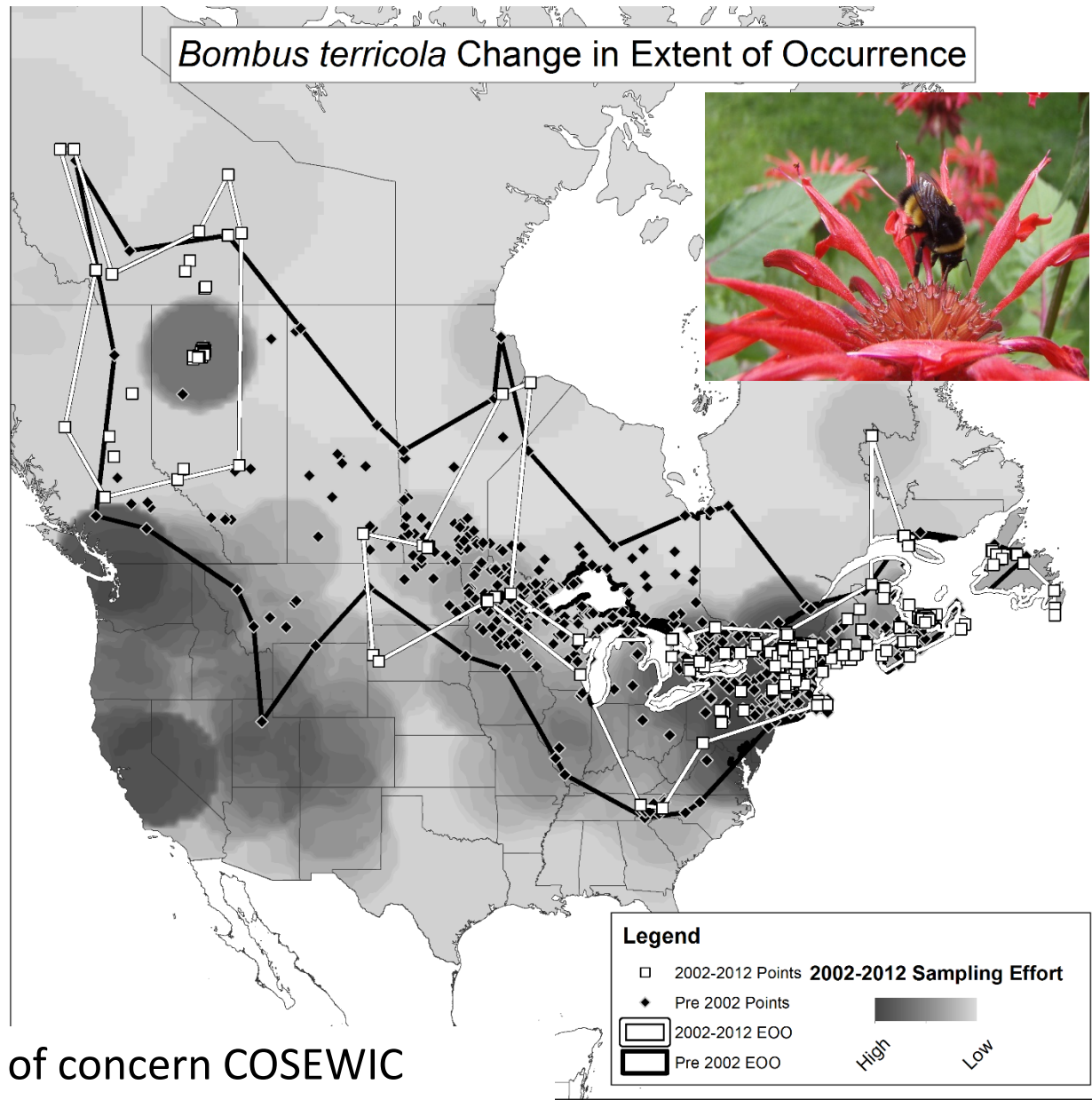
Relative Abundance (to historic value): **20%**

Persistence (relative to historic value): **67%**

Average Decline: 50%

IUCN Red List:
Vulnerable

Species of concern COSEWIC



Bumble Bee Extinction Risk Assessment



Bombus affinis
Rusty patched bumble bee

Range loss (adjusted by collection effort): **45%**

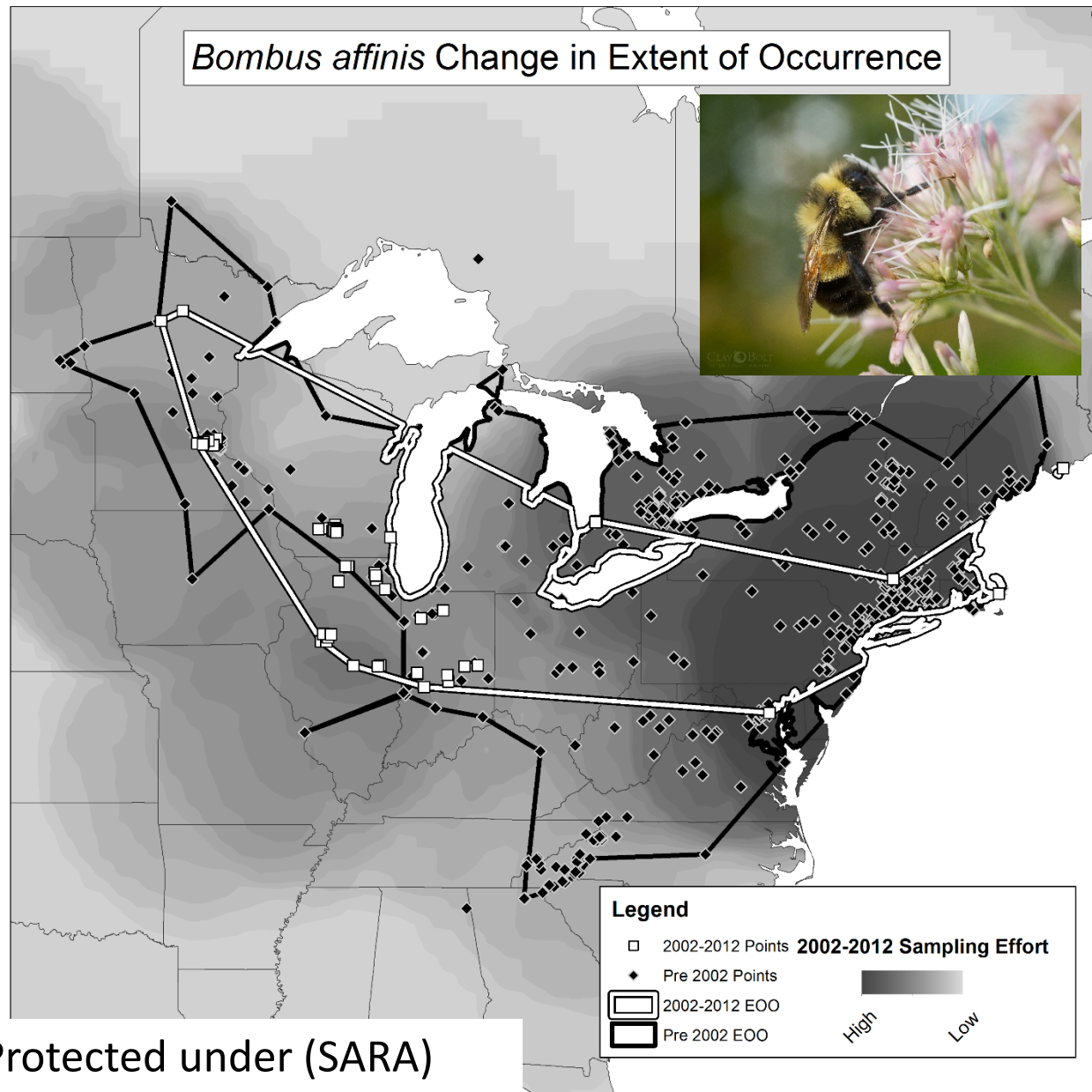
Relative Abundance (to historic value): **7%**

Persistence (relative to historic value): **30%**

Average Decline: 69%

IUCN Red List:
Critically Endangered

Protected under (SARA)



Bumble Bee Extinction Risk Assessment



Bombus occidentalis Western bumble bee

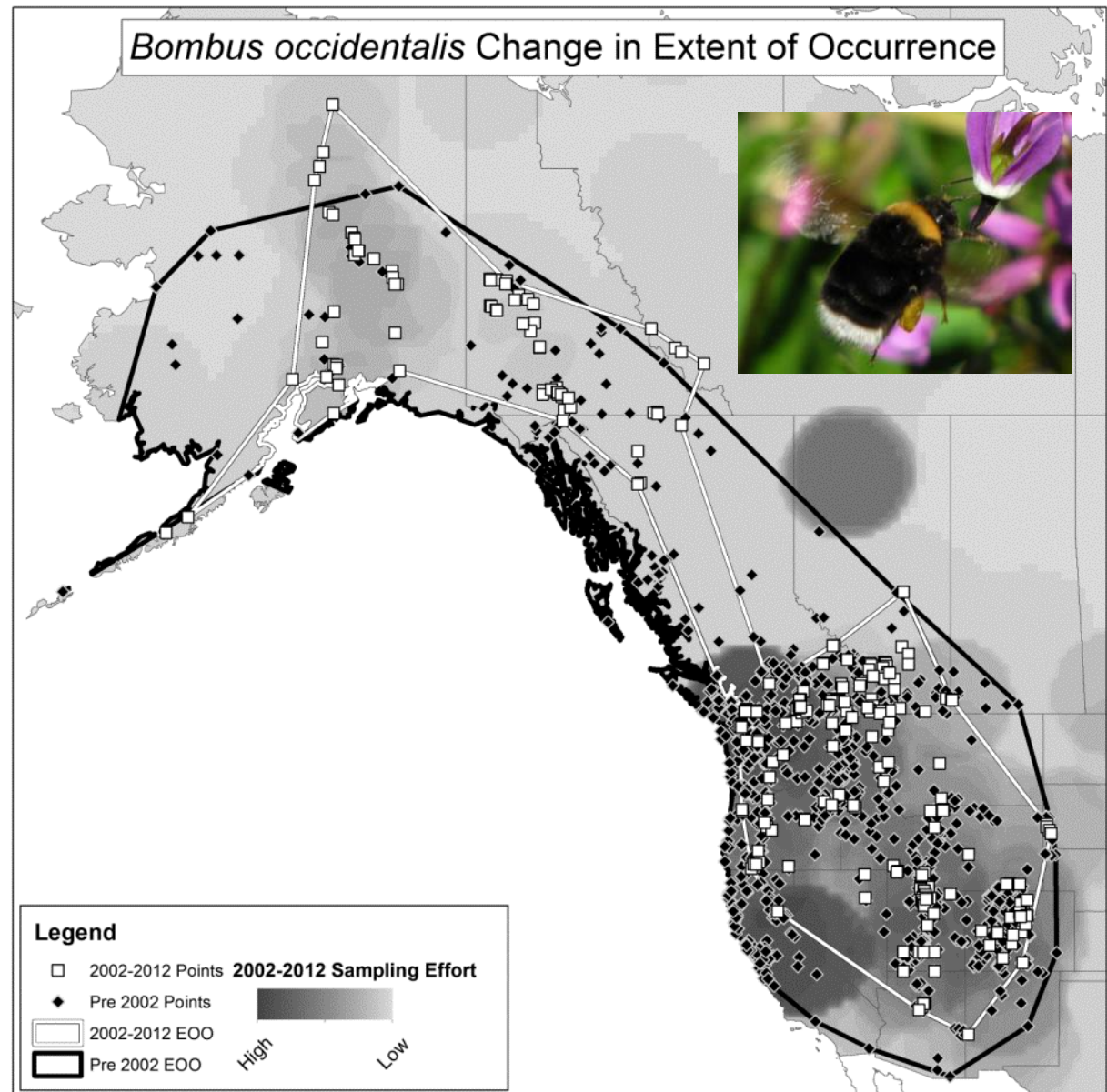
Range loss (adjusted by
collection effort): **22%**

Relative Abundance (to
historic value): **29%**

Persistence (relative to
historic value): **73%**

Average Decline: 40%

IUCN Red List: **Vulnerable**



Bumble Bee Extinction Risk Assessment



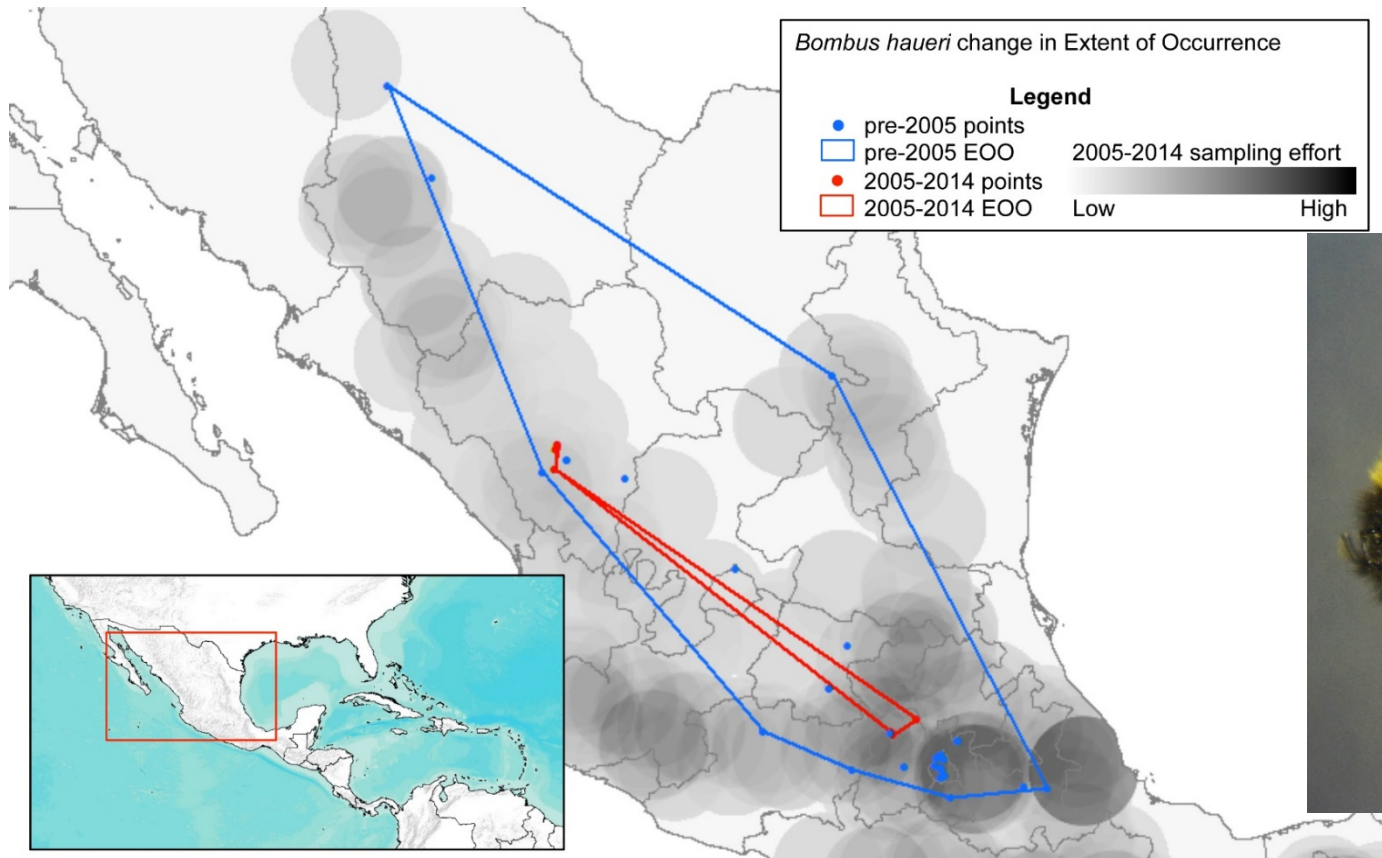
Bombus haueri

Range loss (adjusted by collection effort): **90%**

Relative Abundance (to historic value): **28%**

Persistence relative to historic values: **40%**

Average Decline: 74% IUCN Red List: Endangered



Bumble Bee Extinction Risk Assessment



Bombus vosnesenskii Vosnesensky bumble bee

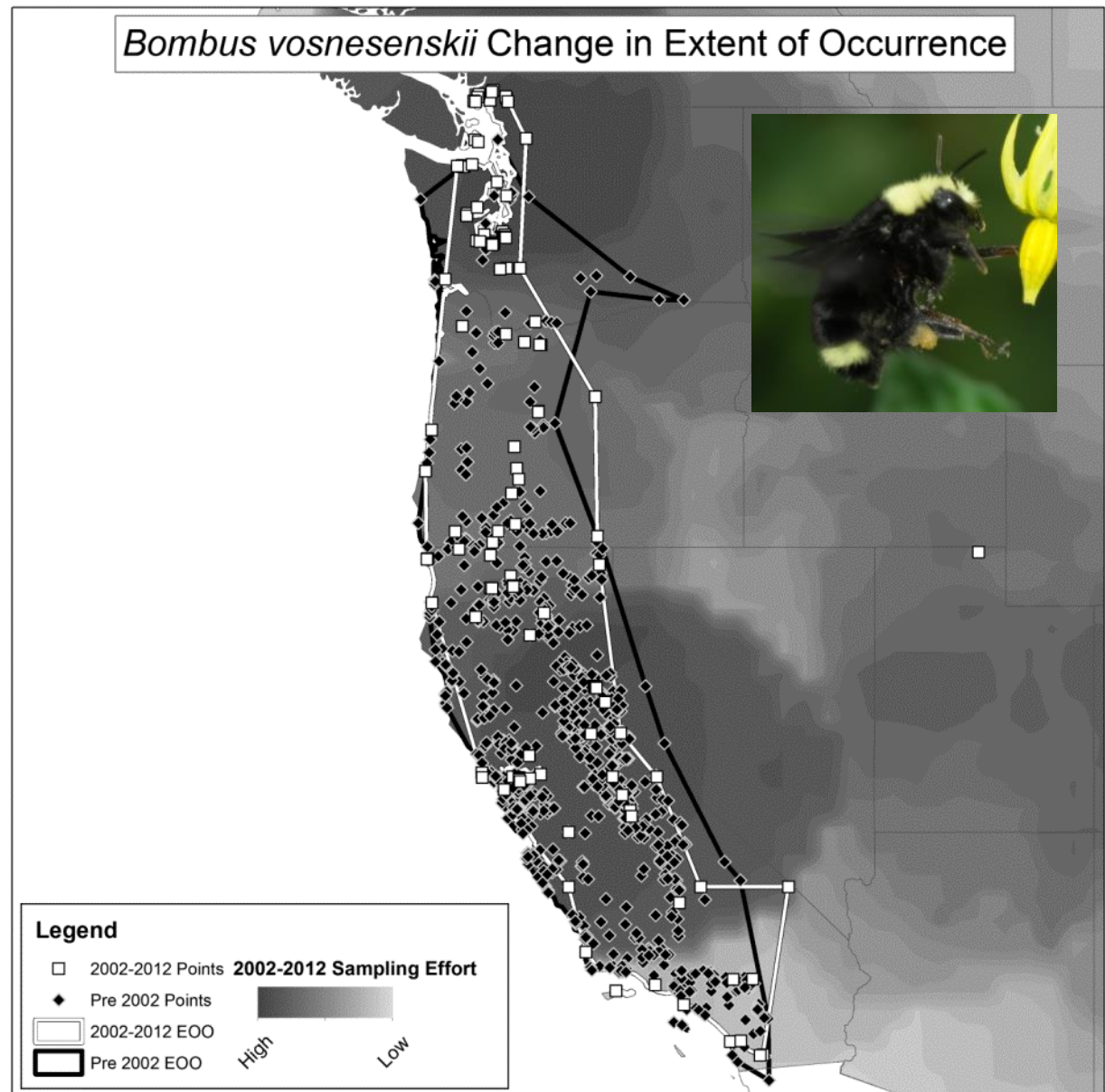
Range loss (adjusted by collection effort): **11%**

Relative Abundance (to historic value): **124%**

Persistence (relative to historic value): **76%**

Average Decline: 0%

IUCN Red List:
Least Concern



Threats to Bumble Bees: Habitat Loss



Photos: Howard F. Schwartz, CSU, Bugwood.org; .



Threats to Bumble Bees: Pesticides

Pesticides have been implicated in the decline of pollinator species.

- Mosquito control and agricultural uses are a threat



Threats to Bumble Bees: Pesticides

More pesticides are used in urban areas than in many agricultural areas.



Threats to Bumble Bees: Systemic Pesticides

Systemic Insecticides:

- Increasingly used on crops, ornamental plants, and lawns
- Systemic mode of action
- Residues in pollen and nectar
- Can be persistent long periods in plants and soil



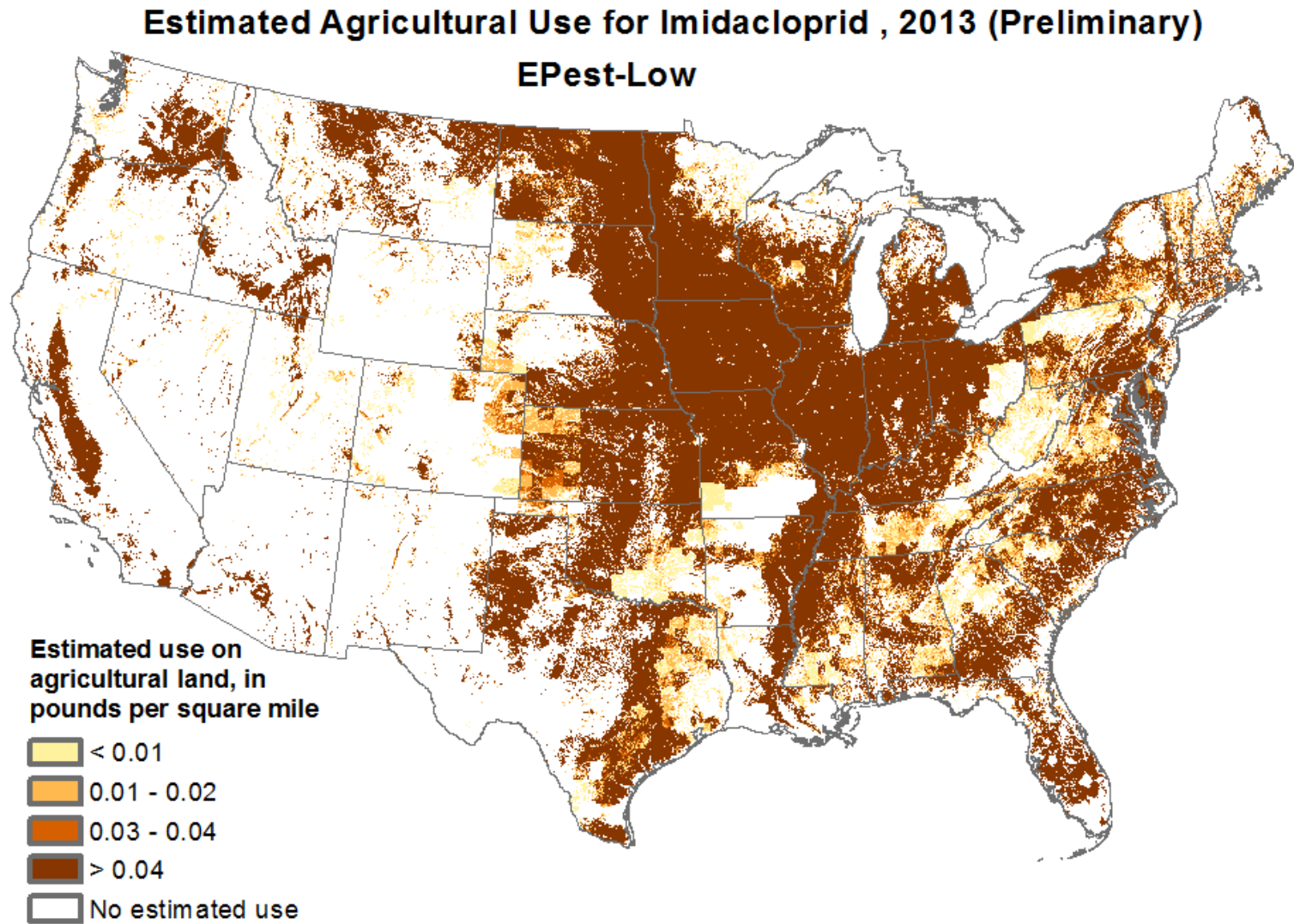
Threats to Bumble Bees: Systemic Pesticides

Most used class of pesticides in the world.

- One of the most widely used class of insecticides in the U.S.



Threats to Bumble Bees: Systemic Pesticides



Threats to Bumble Bees: Disease

Disease

- Moving bees means potentially moving diseases



Source: Graystock et al. 2013; Reade et al 2014; Cameron et al. 2016

Threats to Bumble Bees: Disease

- Pathogens include:

- *Nosema bombi*
- *Crithidia bombi*
- Deformed wing virus
- Many others



Bombus impatiens



Source: Graystock et al. 2013; Reade et al 2014; Cameron et al. 2016



Threats to Bumble Bees: Disease

Disease is implicated in the decline of at least three species in North America.

- *Bombus terricola*
- *Bombus affinis*
- *Bombus franklini*

Source: Cameron et al. 2016



Threats to Bumble Bees: Disease

Significant concerns exist regarding the interaction between honey bees and native bees:

- Competition for floral resources
- Spread of disease



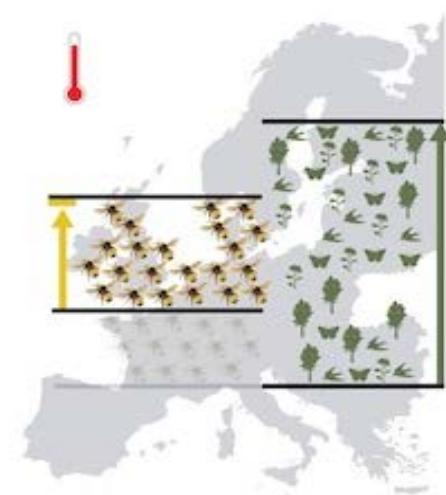
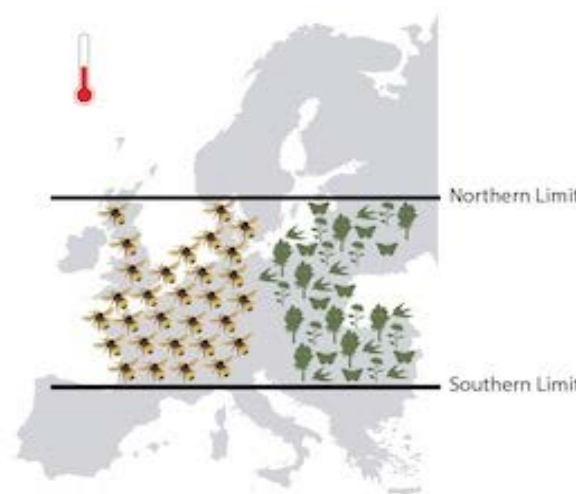
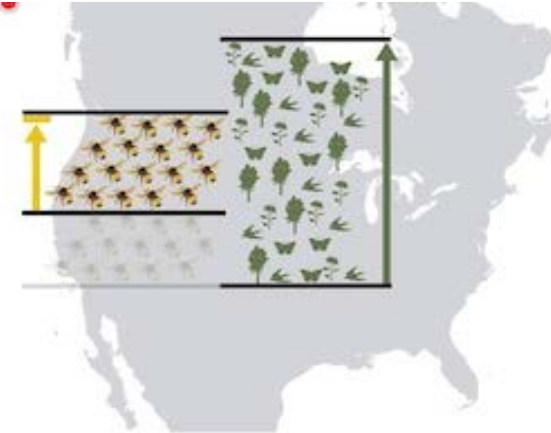
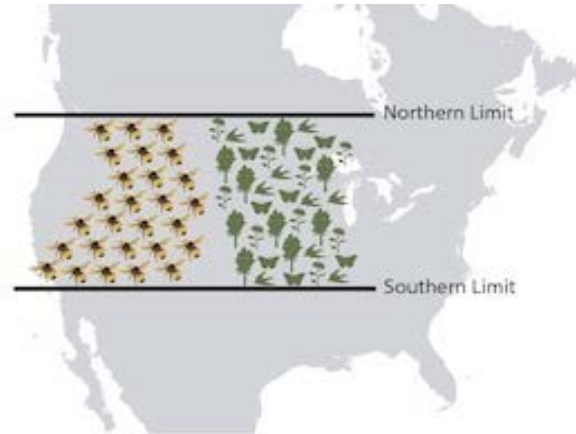
Source: Singh et al. 2010; Furst et al. 2014; Graystock et al. 2014



Threats to Bumble Bees: Climate Change



Scientists are just beginning to understand the potential negative impacts of climate change on pollinators.



Bumble Bee Conservation: Disease

More effective disease detection and management strategies are urgently needed to reduce the pathogen spillover threat from commercially produced bumblebees. – (Graystock et al. 2013)

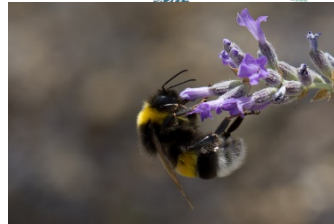


Photo: ASANUMA Takao



Photos: Pete Schroeder, Rich Hatfield, José Montalva



Bumble Bee Conservation: Disease

Only local bumblebee species and subspecies should be grown for commercial development and employed within their native ranges. **All commercial bumblebees should be thoroughly screened for pathogens and parasites by both producers and independent regulators.**

- Joint Policy Statement IUCN BBSG



Bumble Bee Conservation: Pesticides

Cities, counties, states and provinces can pass ordinances that will protect bumble bees and other native bees from pesticides.

Federal regulatory agencies should ensure the unique risks native bees face are considered in pesticide registration and on pesticide labeling.



Bumble Bee Conservation: Pesticides

Additional land management agencies can follow the lead of the USFWS National Wildlife Refuge System in phasing out neonicotinoids on properties they manage.



Bumble Bee Conservation: Incentives

US Farm Bill provides cost share funding for habitat improvements thereby lowering the cost for restoration and enhancements.



Photo: Nancy Adamson

Bumble Bee Conservation: Incentives

In partnership with NRCS and private landowners, working through farm Bill Programs Xerces has restored and enhanced more than 245,000 acres of flower rich habitat in agricultural landscapes



Bumble Bee Conservation: Management Guidance

Guidelines for conserving and managing bumble bee habitat.

Conserving Bumble Bees

Guidelines for Creating and Managing Habitat for
America's Declining Pollinators

Rich Hatfield, Sarina Jepsen, Eric Mader, Scott Hoffman Black, and Matthew Shefferson

THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION



BUMBLE BEE CONSERVATION

Protecting These Important Pollinators

Bumble bees are essential pollinators in the wild, parks, farms, and urban areas of North America, yet many species are suffering alarming declines. It is critically important to protect the remaining populations.

Good-quality habitat is essential to support bumble bees. There are simple things you can do to modify current management that typically don't involve significant increases in cost or effort, but which can produce significant benefits for bumble bees.

Inside you'll find a field guide to habitat management designed to be in sync with the bumble bee life cycle.

Bumble Bee Conservation: Management Guidance

Xerces is finalizing an agreement with USFS to develop “best management practices” for native pollinators on rangelands in the western US.



Bumble Bee Conservation: Management Guidance

Xerces is working with ICF International under a contract with the Federal Highway Administration to develop roadside Best Management Practices.



Pollinators and Roadsides: Best Management Practices for Managers and Decision Makers



January 2016



U.S. Department of Transportation
Federal Highway Administration

Pollinators and Roadsides: Best Management Practices for
Managers and Decision Makers

1

December 2015
Federal Highway Administration



Bumble Bee Conservation: Citizen Science

BUMBLE BEE WATCH

A collaborative effort to track and conserve
North America's bumble bees

Join us today at
www.BumbleBeeWatch.org

THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION



BeeSpotter

Bumble Bee Conservation: Citizen Science

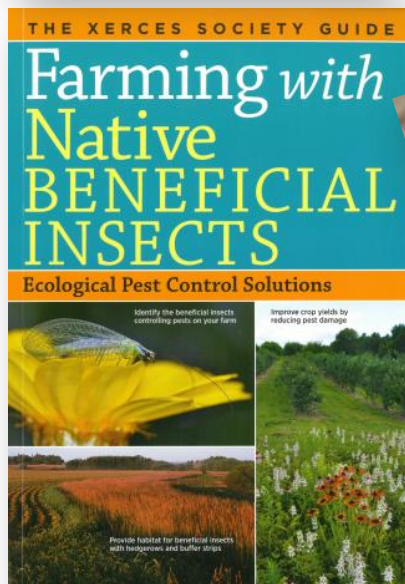
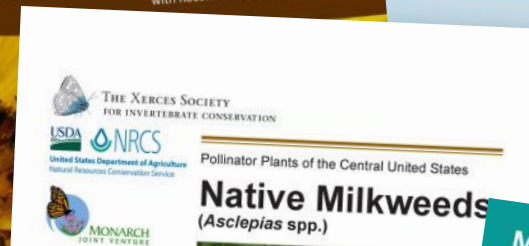
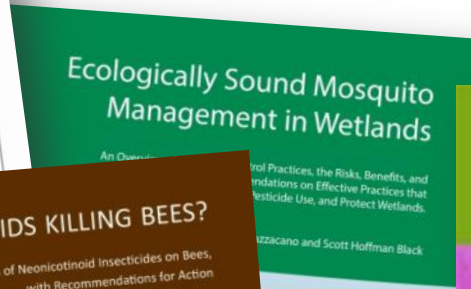
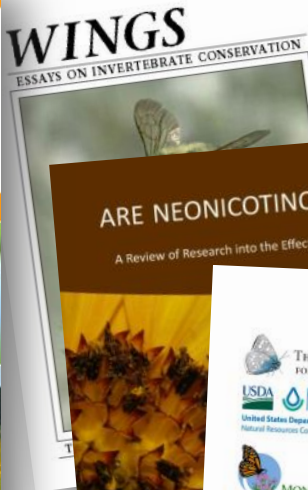
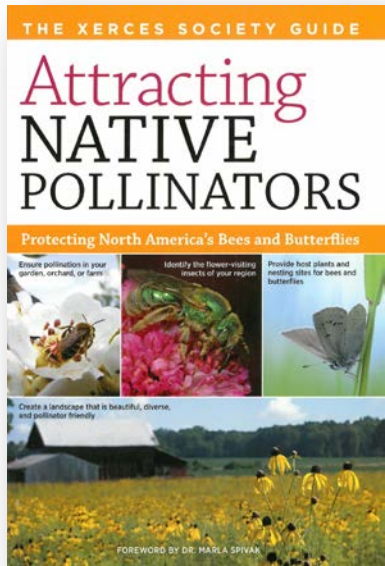


Bumble Bee Citizen Science data is used to:

- Identify the current distribution of at-risk species
- Reach out to land managers who host these species with conservation guidance
- Inform future recommendations to land managers regarding how to conserve, enhance, and restore high quality bumble bee habitat



The Xerces Society: Resources



Questions?



WANTED

FOR POLLINATION OF CROPS AND WILDFLOWERS



Once common throughout Eastern North America, *Bombus affinis* numbers have steeply declined in recent years. To conserve *B. affinis*, the Xerces Society is documenting the former and current ranges of this humble bee with a rusty-colored patch on her legs, and they need your help: any information leading to the conservation of this species will be duly rewarded with increased food security.

RUSTY PATCHED BUMBLE BEE A.K.A. *BOMBUS AFFINIS*

NOT TO BE CONFUSED WITH *BOMBUS VAGANS* OR *BOMBUS GRISSECOLLIS*

Bombus affinis workers have all their legs as their wings, distinguishing them from *Bombus vagans*.

B. affinis workers also have a rusty-colored patch on their legs, and they need your help: any information leading to the conservation of this species will be duly rewarded with increased food security.

B. affinis workers have yellow hair on the rear half of their bodies, distinguishing them from *Bombus griseocollis*.



Bombus affinis *Bombus vagans* *Bombus griseocollis*

If you have seen *Bombus affinis* please contact info@xerces.org
For more information on bumble bees in decline please visit www.xerces.org/bumblebees


Illustration by: [Name]




THE XERCES SOCIETY GUIDE

Attracting NATIVE POLLINATORS


Protecting North America's Bees and Butterflies



Ensure pollination in your garden, orchard, or farm




Identify the flower-visiting insects of your region



Provide best plants and nesting sites for bees and butterflies

Create a landscape that is beautiful, diverse, and pollinator friendly



FOREWORD BY DR. MARLA SPIVAK

