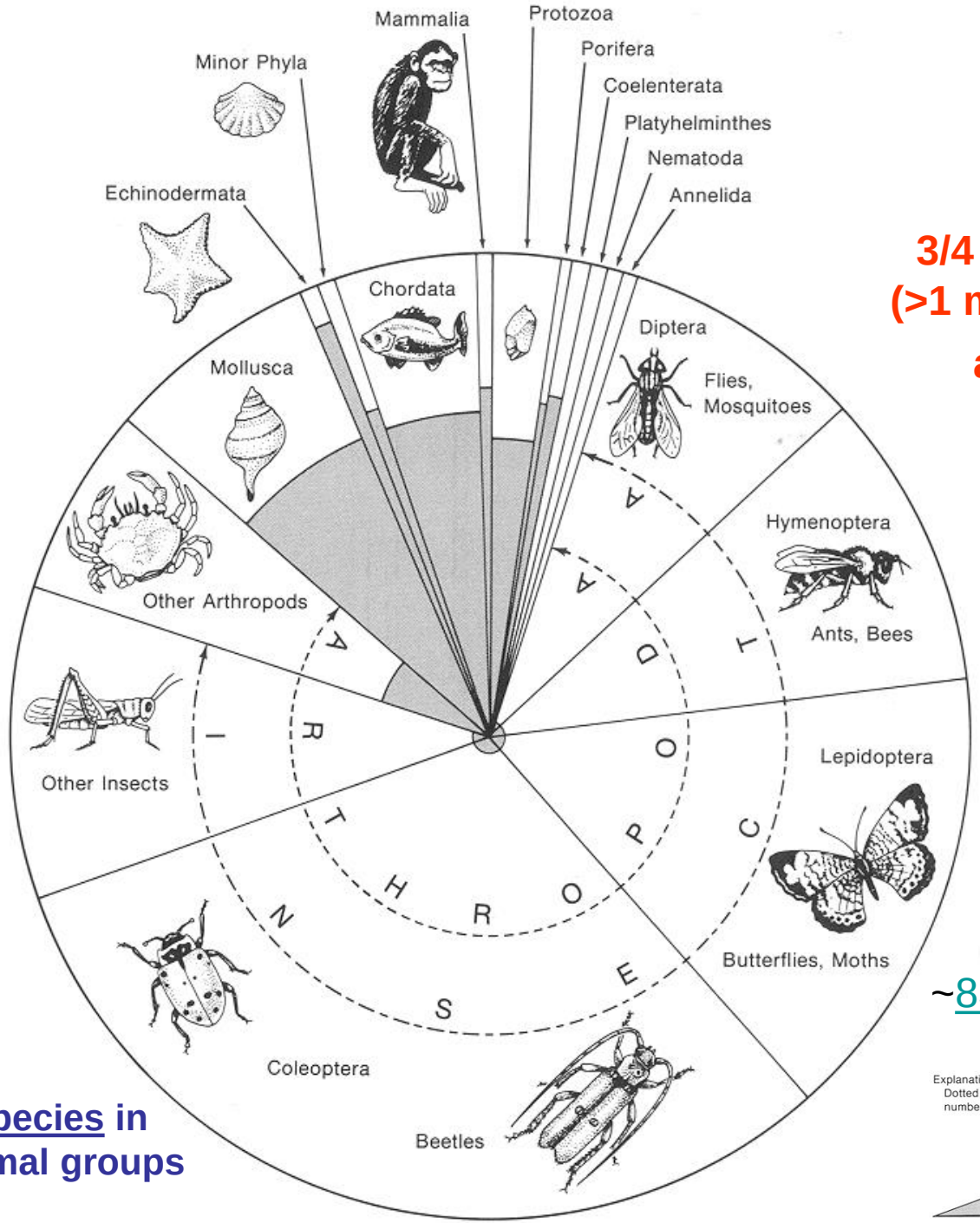
Are the Earth's Insects Disappearing?

By Peter J. Bryant,
University of California, Irvine

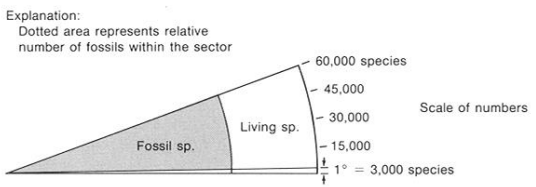


3/4 of all animals (>1 million species) are insects!

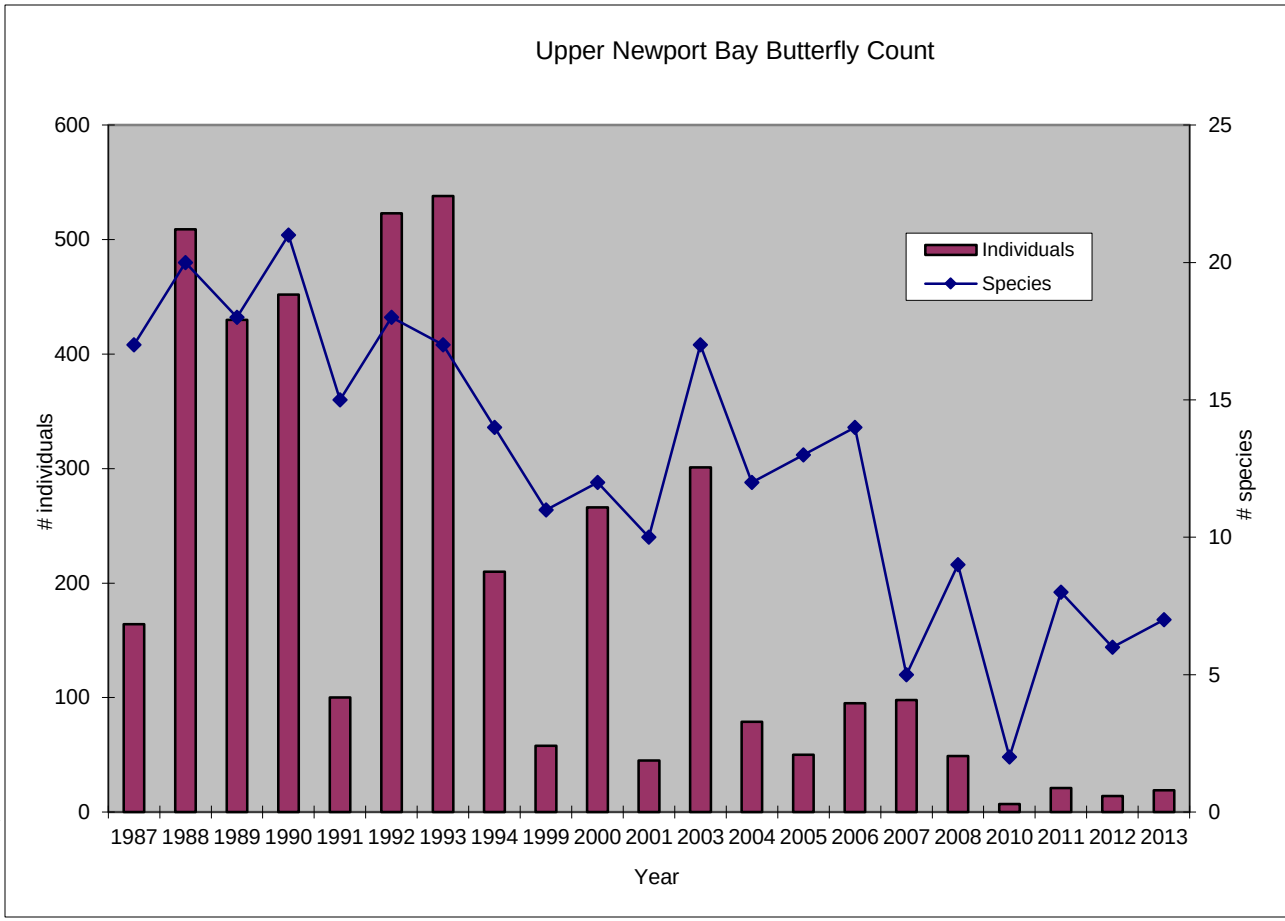
28,000 species of Butterflies

~[83 in Orange County]

[Number of species] in different animal groups



July 4 Butterfly Count (North American Butterfly Association)
Newport Beach, Orange County Section



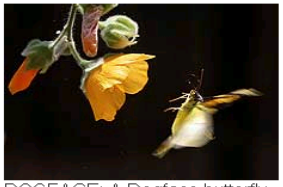
Friday, August 3, 2007

Where have butterflies gone?

A decline in several species appears to be drought-related.

By ALEX BARON
The Orange County Register

Butterfly counters combing the bluffs, fields and foothills of Orange County are finding them emptier of normally abundant species than at any time in at least two decades.

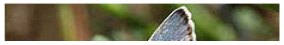


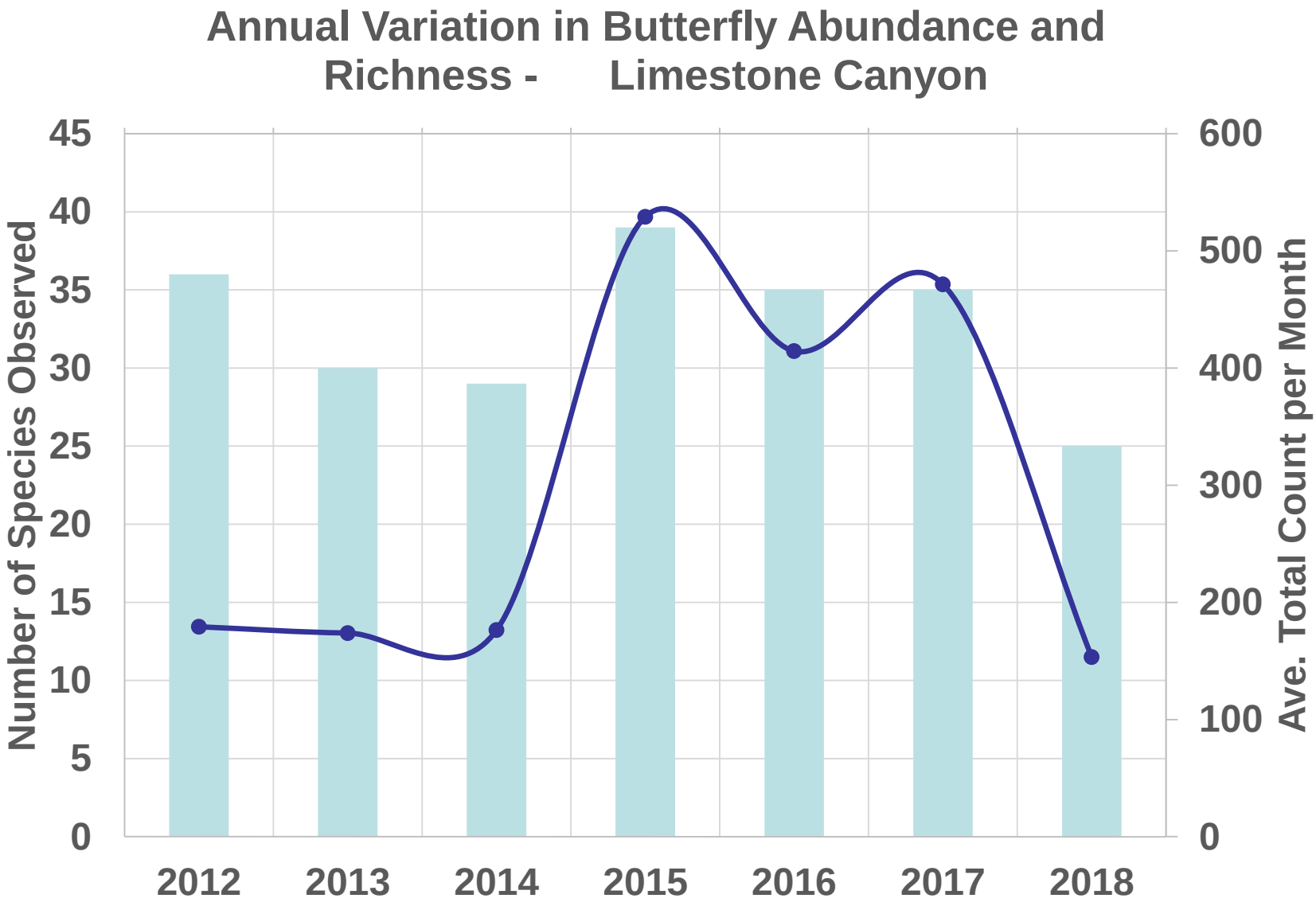
DOGFACE: A Dogface butterfly, the California State butterfly, hovers over a blossom at the Environmental Nature Center Butterfly House in Newport Beach.

JEBB HARRIS, THE ORANGE COUNTY REGISTER

MORE PHOTOS

Acmon Blue




Annual Variation in Butterfly Abundance and Richness - Limestone Canyon
Number of Species Observed
Ave. Total Count per Month
0
5
10
15
20
25
30
35
40
45
0
100
200
300
400
500
600
2012
2013
2014
2015
2016
2017
2018

Global, 2009

Where have all the butterflies gone?

Butterfly species around the world are being threatened by climate change and loss of habitat.

PLENTY MAGAZINE
April 14, 2009, 5:19 p.m.

Photo: Orin Optiglot

Around the world, butterfly species are in trouble. Climate change, habitat destruction, drought, and poaching are just a few factors causing numbers of some species to drop as much as 90% in some regions.

Britain 2018:

Where have all the butterflies gone?

Disappearing butterflies | Patriarchy and religion | Protesting Trump | Getaways in a Morris Minor | Ikea

Letters

Mon 25 Jun 2018 13.15 EDTLast modified on Wed 27 Jun 2018 10.41 EDT

A cabbage white butterfly on a flower in Hampshire last year. Photograph: Geoffrey Swaine/REX/Shutterstock

Not only have I not seen a single cabbage white butterfly this year but no red admirals, no peacocks and no tortoiseshells. Very worrying.

WHERE HAVE ALL THE BUTTERFLIES GONE?

PACIFIC STANDARD STAFF · OCT 31, 2016

Butterflies in the U.K. have been in decline for decades, and climate variability—a side effect of global warming—may be to blame.

By Nathan Collins

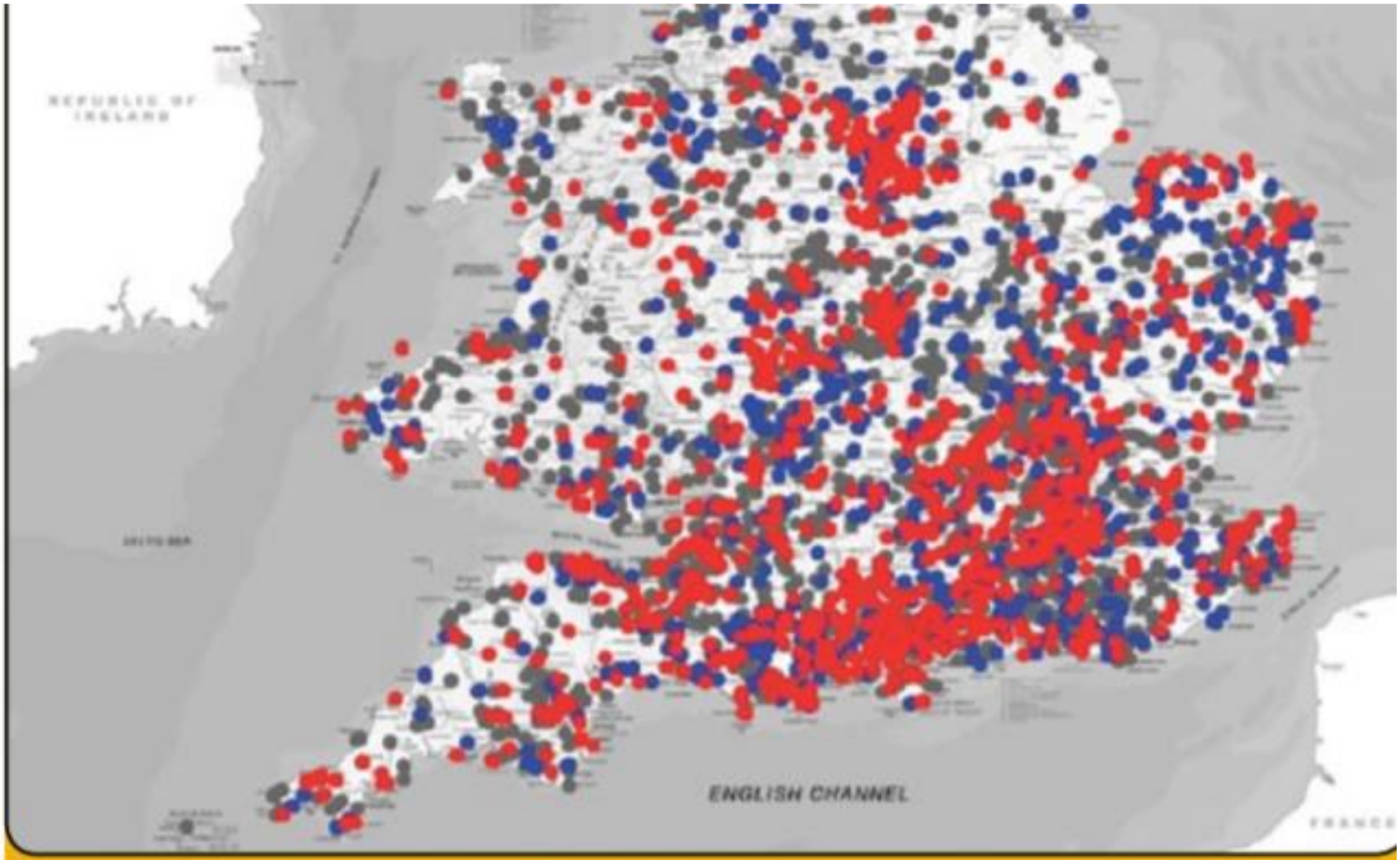


Figure 2: Location of monitored sites in 2015. UKBMS sites producing a site index (red circles), WCBS squares walked (blue circles), sites and squares not walked in 2014 (grey circles)

Long-term trends

UK-wide and country level trends are described below, whilst further information on each species, including individual collated index plots, are available at the UKBMS website **www.ukbms.org**.

UNITED KINGDOM

For the UK we are able to report on long-term and ten-year trends for 57 of the 59 regularly occurring species, including 29 habitat specialist species, 25 wider countryside species and the three regular migrants (Table 1). Since 1976, 40% of species show positive trends, 58% show negative trends, whilst **Meadow Brown** shows no change. Of the species with a significant trend, 13 species (37% of the total) show a long-term increase, whilst 22 (63%) are in significant decline. The top ten species showing the most acute long-term decline (in rank order, most rapidly declining first) are **White-letter**

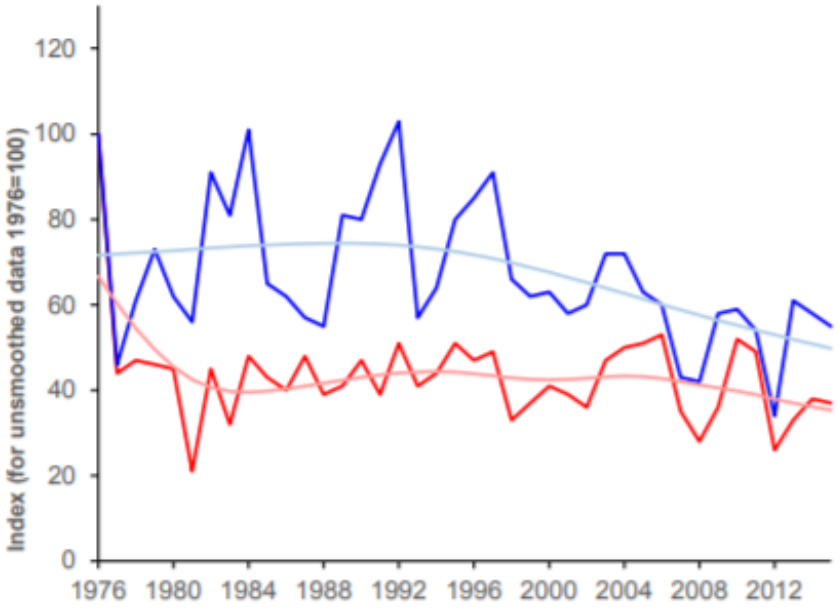
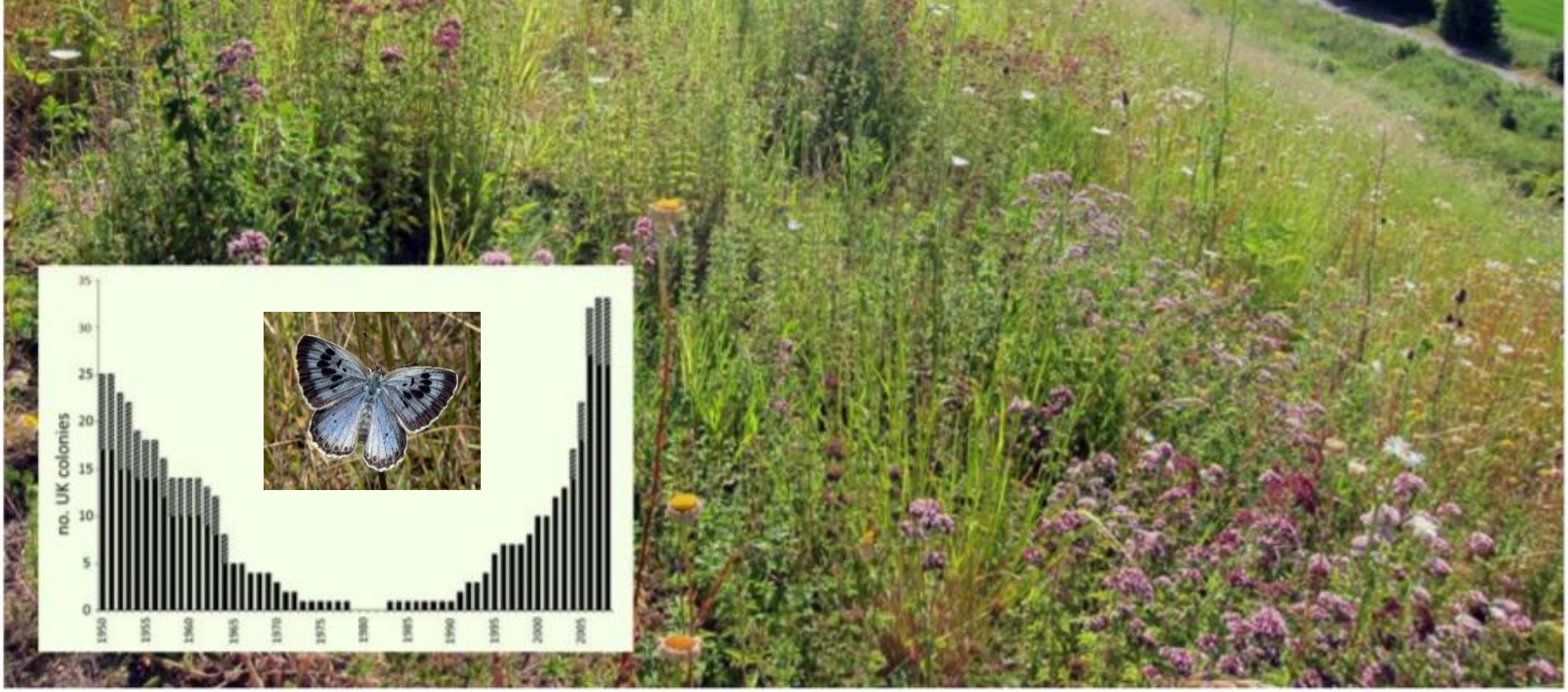


Figure 3. Trends in butterfly populations for habitat specialists (red) and species of the wider countryside (blue) 1976 to 2015. For each species group, darker lines are unsmoothed indices, paler lines are smoothed trends.

From the Big Butterfly Count:
More than three-quarters of the UK's butterflies have declined in the last 40 years, with some common species suffering significant slumps.



Following extinction in the UK in 1979, the globally threatened butterfly *Maculinea arion* was successfully re-introduced using a similar genotype from Sweden and has now spread to ~35 sites (inset), each specifically managed to contain the optimum larval habitat and also located within the quinquennial adult colonisation ranges of 5-11 other populations[15]. New sites include this 5ha railway embankment, designed and created from scratch in 2004.

Large Blue Butterfly, *Maculinea arion*. Larval foodplant is Wild Thyme *Thymus polytrichus*. The conservation program that helped revitalize the large blue required the establishment of *M. sabuleti* ants in addition to the butterflies.

North America, 2018

Butterfly numbers plunge by 50 percent

by Ecosystem Gardener | Oct 10, 2018 | Butterfly Gardening

Butterfly lovers have noticed an alarming trend–butterfly numbers are down over 50 percent this year.

The North American Butterfly Association (NABA) has sponsored butterfly counts since 1992, and has noted significant drops in butterfly populations this year.

Washington, D.C., 2008

Where have all the butterflies gone?

Washington, DC. 2008 JUNE 19

About the author: Lina Younes has been working for EPA since 2002 and chairs EPA's Multilingual Communications Task Force. Prior to joining EPA, she was the Washington bureau chief for two Puerto Rican newspapers and she has worked for several government agencies.

Lea la versión en español a continuación de esta entrada en inglés.
Some links exit EPA or have Spanish content. EXIT Disclaimer

For all those garden enthusiasts—whether you have a green thumb or not—have you noticed anything different this season?

The reason I'm asking the question is that I'm yet to see any butterflies in my backyard. Don't know if I just haven't seen them or of something else is going on.

I've tried to create a healthy natural setting that will encourage regular visits from benefitial insects and wildlife. I normally use greenscaping techniques to protect the environment. I have specifically planted several shrubs and perennials that supposedly attract bees, butterflies and birds—aster, yarrow, butterfly bush, and daylilies, to name a few. Overall, the flowering plants are blossoming as expected this year. Currently, I've noticed that my birdhouses already have their share of regular tenants. The hummingbirds have already made an early appearance—but no butterflies.

I was hoping to enjoy the colorful scenery with these fluttering visitors while leisurely resting at my deck, but I suppose I'll have to be patient. Nonetheless, I have two other options in the DC metropolitan area at this time to see butterflies from around the world. The Smithsonian Institution's National Museum of Natural History has an exhibit on Butterflies + Plants: Partners in Evolution through the 10th of August and the Brookside Gardens South Conservatory in Wheaton, MD has a live butterfly exhibit called "Wings of Fancy" through September 21st. I highly recommend them to anyone who wishes to learn more about these colorful insects. If you're traveling through DC, they exhibits are definitely worth a couple hours of your time.

Minnesota, 2012

Posted on June 30, 2012 by Sue

← Previous Next →

Where have all the butterflies gone?

Minnesota

The summer flowers have bloomed, but there are very few butterflies in the garden. In fact I have only seen one Monarch butterfly in the past three weeks. We had a very early spring in Minnesota and that encouraged early emergence of overwintering butterflies, like the Red Admiral, the Eastern Comma, the Mourning Cloak, and the Tortoiseshells in March (see "Spring has Sprung"). The warmer weather in the central part of the US also encouraged migrants to move up to the northland, well before their favorite host plants were leafed out enough to support their larvae. I wrote about this earlier on May 12 (see "Ridiculously Early").

While the swamp milkweed plants were putting on height and leaves, I looked for monarch larvae and found only one, on the smallest stem of the bunch, on June 11.

Central California, 2006

Science News Share Blog Cite

Where Have All The Butterflies Gone?

ScienceDaily (May 8, 2006) — Cold, wet conditions early in the year mean that 2006 is shaping up as the worst year for California's butterflies in almost four decades, according to Art Shapiro, professor of evolution and ecology at UC Davis.

See also:

Plants & Animals
- Insects and Butterflies
- Extinction
- New Species

Earth & Climate
- Severe Weather
- Weather
- Earthquakes

Reference

That's a turnaround from last spring, when millions of painted lady butterflies migrated through the Central Valley. But other species have seen steep declines in recent years and could disappear from the region altogether.

"It has been the worst spring for butterflies of my 35 in California," Shapiro said. "There will probably be long-term repercussions, especially for species already in serious decline."

Cold, wet conditions early in the year mean that

Results **1** - **10** of about **2,330,000** for **where** have all the butterflies gone

Northern California, 2006

Where Have All the Butterflies Gone?

by nicholas.schwarz on May. 17th, 2006

11 comments

Add a new comment

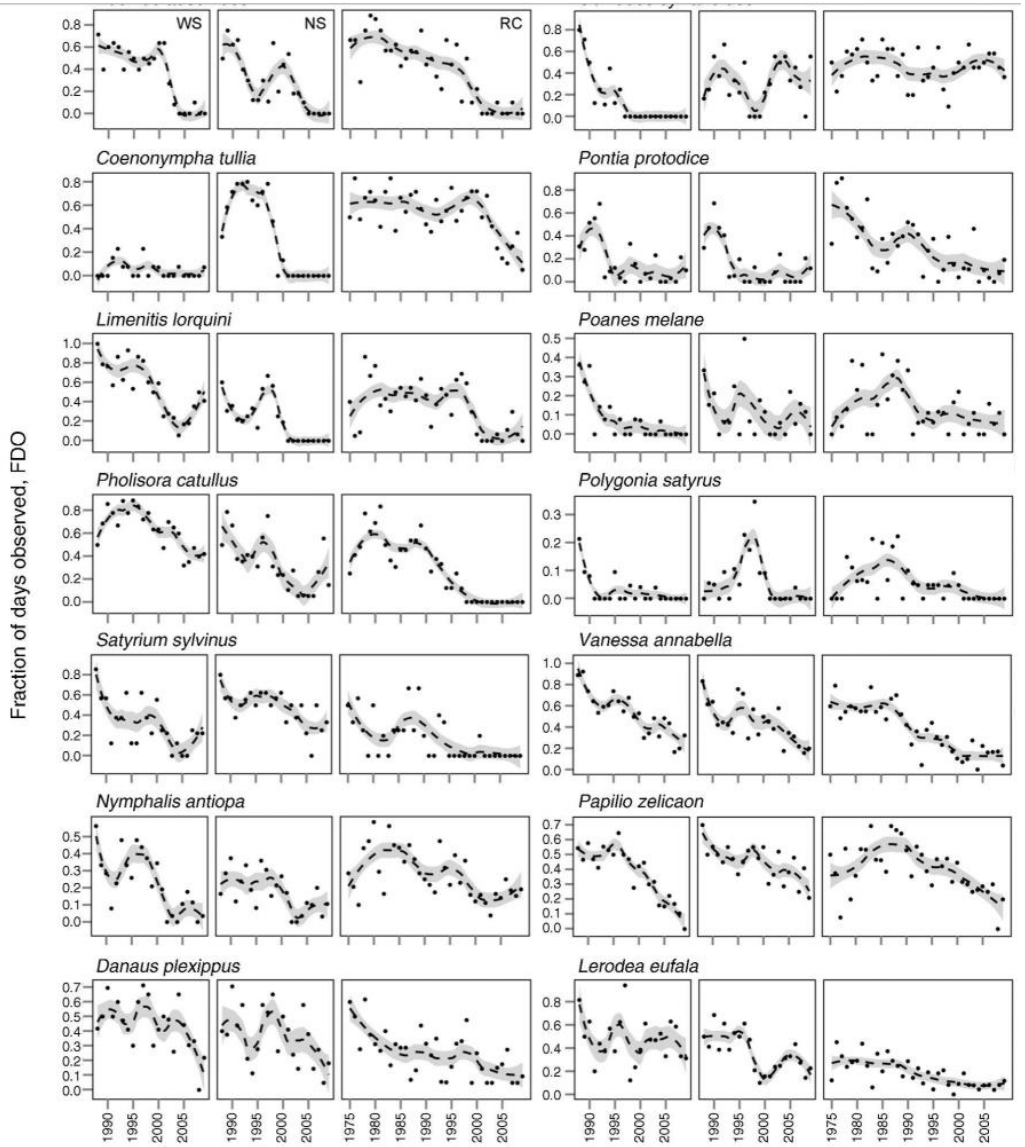
The number of butterflies migrating through California has dropped to a forty year low, according to researchers at the University of California, Davis. One-half of the usual species of butterflies have not appeared this season, and other species have been observed in very low numbers. Climate change related to global warming and habitat destruction may be the cause.

Monarch butterfly:
Courtesy Matt Stratton

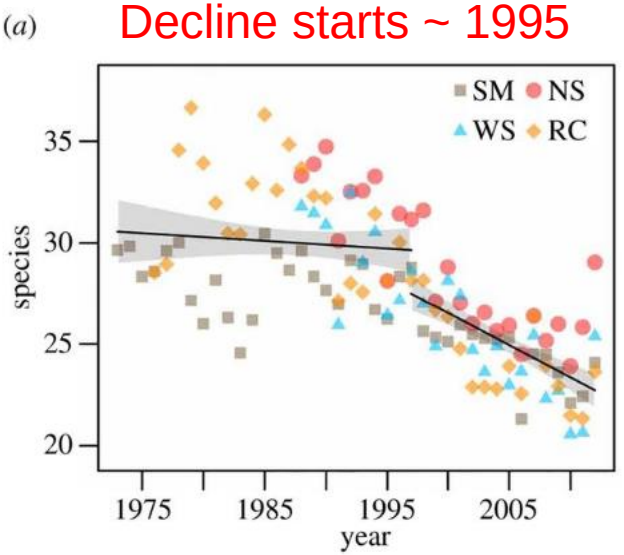
The race is not to the swift: Long-term data reveal pervasive declines in California's low-elevation butterfly fauna

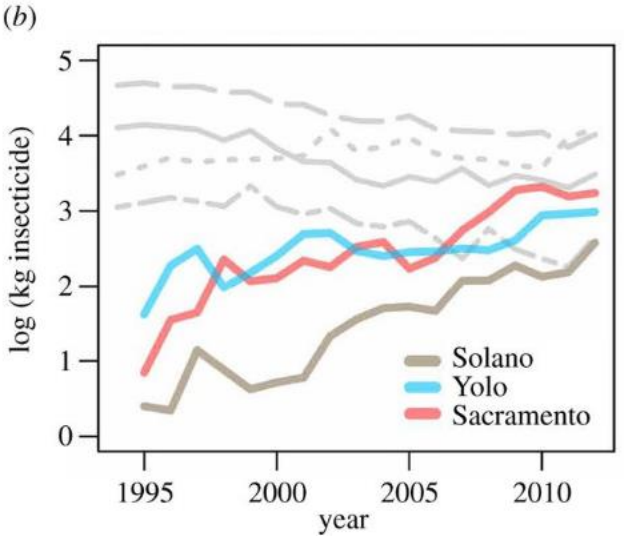
MATTHEW L. FORISTER,[1,3] JOSHUA P. JAHNER,[1] KAYCE L. CASNER,[2] JOSEPH S. WILSON,[1] AND ARTHUR M. SHAPIRO[2]

[1]*Program in Ecology, Evolution and Conservation Biology, Department of Biology, University of Nevada, Reno, Nevada 89557 USA*
[2]*Center for Population Biology, University of California, Davis, California 95616 USA*



Decline starts ~ 1995





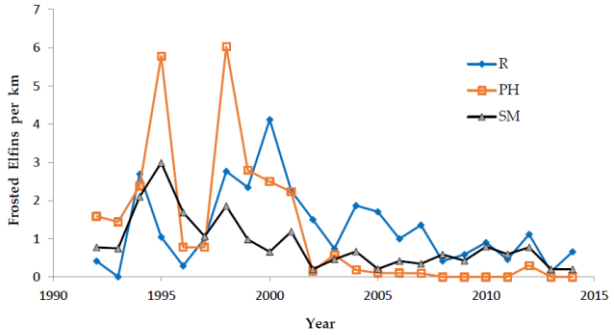


Figure 2. Mean Frosted Elfin individuals per km at the long-term monitoring sites in central Wisconsin, by site type: R = reserve (six sites), PH = permanency of habitat (four sites), SM = shifting mosaic (seven sites). Some values are missing 1992–1993; no values missing 1994–2014.

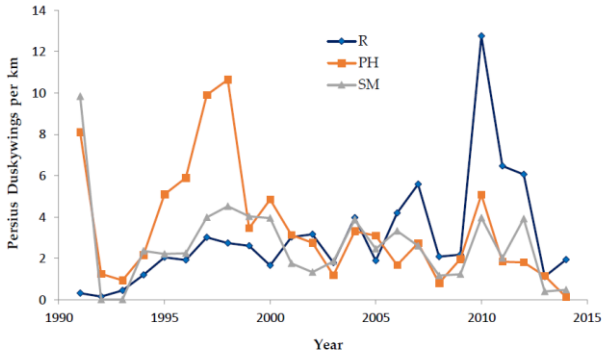
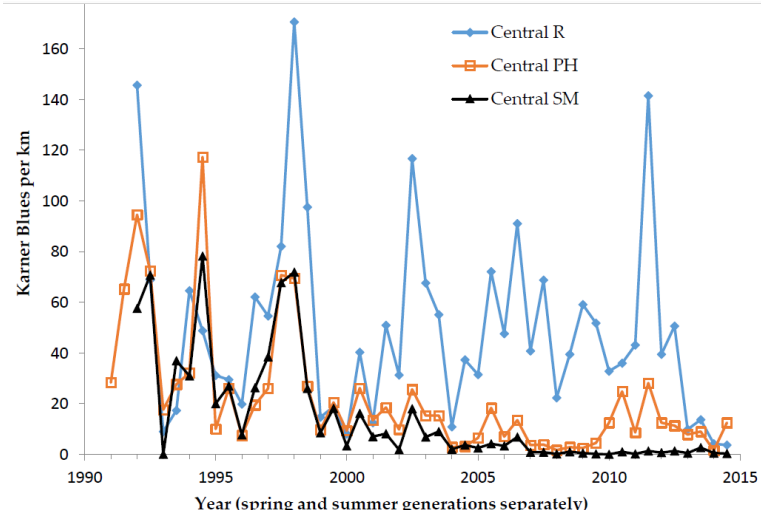


Figure 3. Mean Persius Duskywing individuals per km at the long-term monitoring sites in central Wisconsin, by site type: R = reserve (five sites), PH = permanency of habitat (five sites), SM = shifting mosaic (seven sites). Some values are missing 1991–1993; no values missing 1994–2014.



Wisconsin

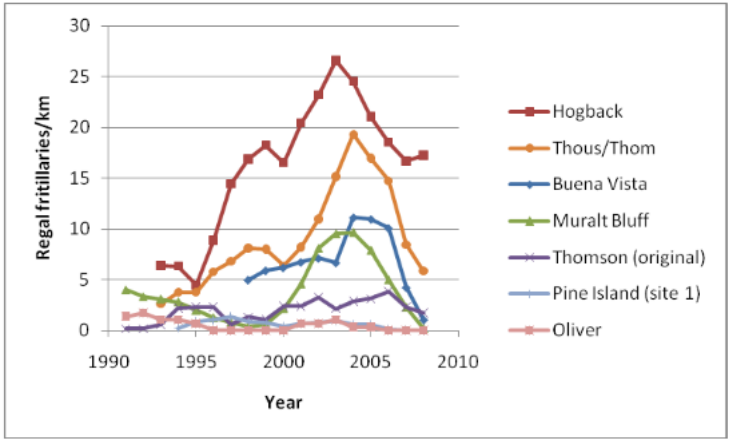
Article

Patterns of Long-Term Population Trends of Three Lupine-Feeding Butterflies in Wisconsin

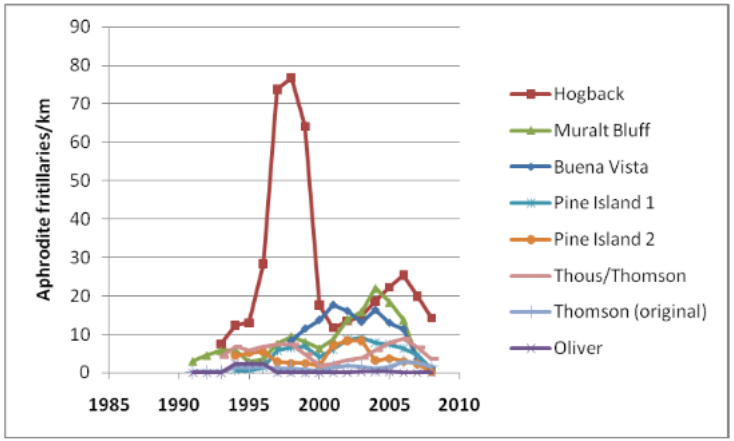
Ann B. Swengel * and Scott R. Swengel

909 Birch Street, Baraboo, WI 53913, USA; aswengel@jvlnet.com
* Correspondence: swengel@naba.org; Tel.: +1-608-356-9543

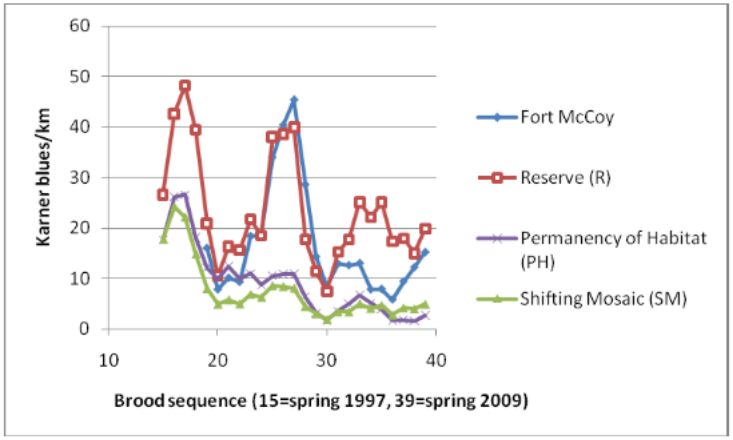
Received: 5 February 2018; Accepted: 13 April 2018; Published: 4 May 2018



Regal fritillary relative abundance (individuals/km) in Wisconsin prairies on the peak survey per site per year, smoothed as three-year running average (plotted in middle year) since no missing years occur in each time series. (An eighth site, Pine Island 2, is not graphed because during 1993-2009, positive values occurred only in 1995-96.) **Regal fritillary had 5/8 negative trends (a non-significant distribution), none significant, while one positive trend was significant (Hogback).**



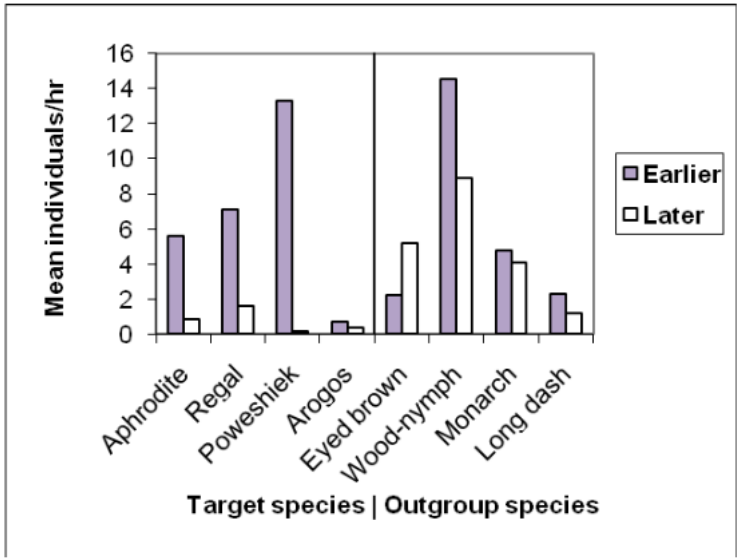
Aphrodite fritillary relative abundance (individuals/km) in Wisconsin prairies on the peak survey per site per year, smoothed as three-year running average (plotted in middle year) since no missing years occur in each time series. **Aphrodite fritillary had no significant trends, with 3/8 negative.**



Karner blue (*Lycaeides melissa samuelis*, male shown above) relative abundance (individuals/km) in central Wisconsin pine barrens on peak survey per site per brood (two broods per year). Sites are Fort McCoy, R (reserve), PH (permanency of habItat), and SM (shifting mosaic), smoothed as three-brood running average (plotted in the middle brood) since no missing broods occur in each time series. Swengel data are adjusted down by the calibration constant of 2.4 to be comparable to Fort McCoy surveys.

DECLINES OF PRAIRIE BUTTERFLIES IN THE MIDWESTERN U.S.A.

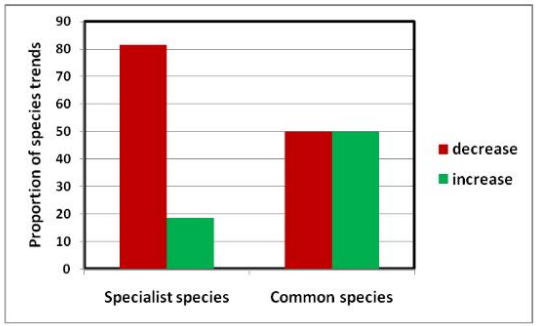
SCOTT R. SWENGEL (909 Birch St., Baraboo, WI 53913 USA; swengel@naba.org)
DENNIS SCHLICHT (Iowa Lepidoptera Project, 1108 First Avenue, Center Point, IA 52213 USA)
FRANK OLSEN (1513 Parkwood Lane NE, Cedar Rapids, IA 52402 USA
ANN B. SWENGEL (909 Birch St., Baraboo, WI 53913 USA; swengel@naba.org)



Mean relative abundance (individuals/hr) in Iowa prairies in the earlier period (1989-96) and later (2004-07), for target species (prairie species of conservation concern) and outgroup species (not of conservation concern). Included sites have at least one survey result in each period, using whichever survey team produced the peak in as many years as survey data were available.

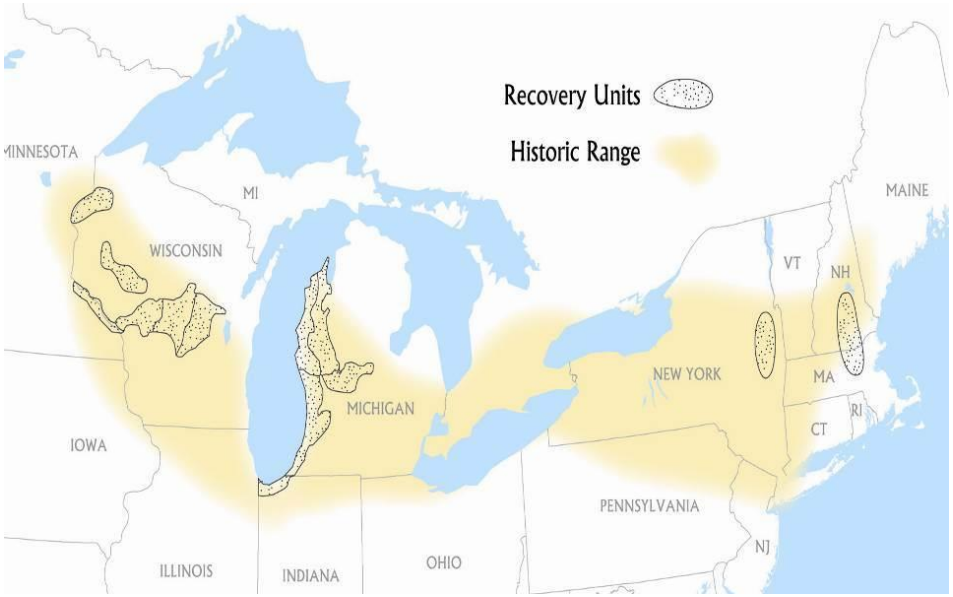
SPECIALIST BUTTERFLY DECLINES IN MINNESOTA

The target species in Schlicht et al. (2009), summarized here as additional context, were prairie-specialist species (**Dakota skipper *Hesperia dacotae* shown at right**, ottoe *H. ottoe*, and arogos skippers *Atrytone arogos*; Poweshiek skipperling *Oarisma poweshiek*; regal fritillary *Speyeria idalia*) and the outgroup of five "common" species (most frequently recorded non-specialist) species (Aphrodite fritillary *S. aphrodite*, meadow fritillary *Boloria bellona*, common wood-nymph *Cercyonis pegala*, monarch *Danaus plexippus*, long dash *Polites mystic*).



Proportion of negative and positive trends (correlations of relative abundance with year), regardless of significance, for prairie specialists (excluding 3/3 negative trends for Ottoe skipper, covered elsewhere). **For the four target species, 22/27 trends were negative (binomial $P = 0.001$), while the five outgroup "common" species had an even (random) distribution of positive and negative trends (Schlicht et al. 2009).**

Canada: Karner Blue Butterfly, 2003:



Karner blue butterfly (*Lycaeides melissa samuelis*), has declined by 99% over the past 100 years,

India, 2005:

Where have all the butterflies gone?

17 May 2005, 2126 hrs IST, Divya Khanna, TNN

Print Save EMail Write to Editor

When was the last time you saw them in your garden? Delhi Times on the vanishing species...

The warning bells are ringing. India's butterfly population is dwindling fast. Thanks to a thriving smuggling industry, the Atlas moth of the Khasi Hills is almost extinct, and exotic species like the Copper Butterfly, Swallowtail, Purple Emperor, Bhutan Glory and Malabar are in danger.

* The economic value of pollination by butterflies to agriculture is $200 billion dollars per year

* Stuffed in suitcases or envelopes, butterflies are smuggled to Japan, Germany, Hong Kong, the UK, Taiwan, Singapore

India, 2013

THE HINDU

DHARWAD, September 24, 2012

Where have all the butterflies gone?

N. DINESH NAYAK

A CAUSE FOR CONCERN:A reality check by an expert has revealed that butterflies may seen become endangered in Dharwad district.— PHOTOS: SPECIAL ARRANGEMENT

As against 28 species spotted 12 years ago, only five species of butterflies are seen now

Japan, 2005:

English Title: Causes of butterfly decline in Japan.
Personal Authors: Inoue, T.
Author Affiliation: Insect Ecology Laboratory, Forestry and Forest Products Research Institute, Matsunosato 1, Tsukuba, Ibaraki 305-8687, Japan.
Document Title: Japanese Journal of Entomology (New Series), 2005 (Vol. 8) (No. 2) 43-64

Abstract:
A literature survey was conducted to analyse the factors affecting the decline of butterflies in Japan. As a result, deforestation and the conversion of natural forests were found to be the main causes of the decline of forest butterfly species, and the recent cessation of traditional mowing of habitat has severely affected grassland butterfly species. The major causes of decline vary from district to district in Japan and from habitat type to habitat type of

South Australia:

Where have all the butterflies gone?

introduction

People remember seeing large numbers of beautiful coloured butterflies everywhere. However it is difficult to know if the number of butterflies has changed without population studies. Butterflies have a special relationship with their habitat which enables them to complete their life cycle and survive. They lay their eggs on particular host plants which also provide food for their larvae. Butterflies also need to protect themselves from predators.

Butterfly habitats have been changed by land clearance for housing and farming. Introduced plants and animals have also had a dramatic impact upon their habitats. Many butterflies cannot survive in these changed habitats while others are doing very well. In this exhibition you will discover which host plants are important for butterflies. There is an urgent need to protect habitats where host plants are found. This will help ensure the continuing survival of the extraordinary diversity of butterflies in South Australia.

Whether you live in the city or in the country you can help preserve the habitats and host plants needed by the butterflies from your area.

New Zealand, 2007

NEW ZEALAND

Where have all the butterflies gone?

5 Mar, 2007 8:47am

Quick Read

Germany, 2018

Delicate creatures

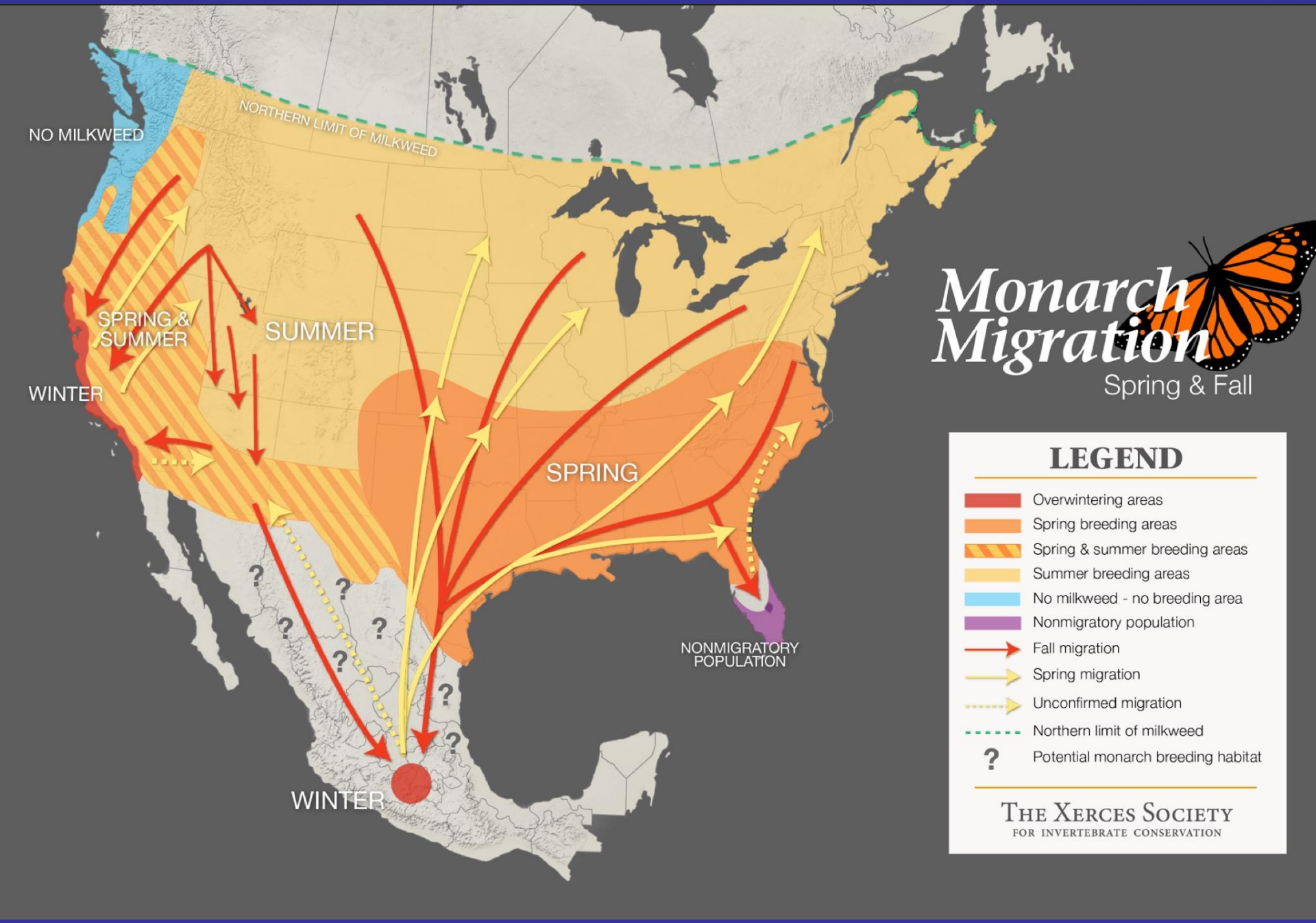
Across the globe, butterflies are under threat. According to the German Wild Animal Foundation, the number of butterfly and moth species present in Germany has halved over the last 30 years. For diurnal butterflies, that decline is nearer 70 percent. This photo shows Colias hyale, which was selected as Germany's "butterfly of the year" in 2017.

Where Have All the Monarch Butterflies Gone?

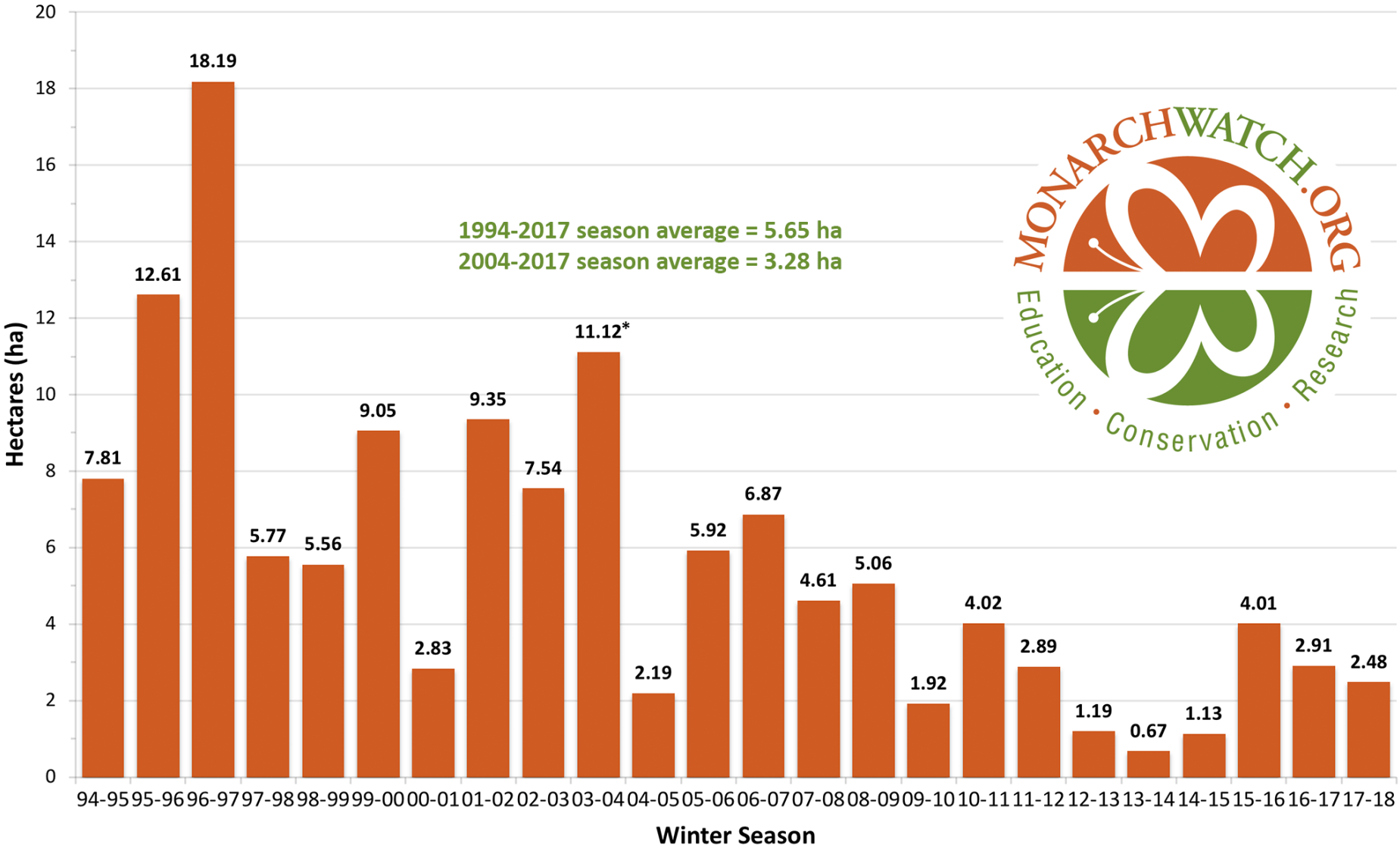
by Kristina Chew | March 15, 2013 | 1:00 pm

Male

Female


NO MILKWEED
NORTHERN LIMIT OF MILKWEED
SPRING & SUMMER
SUMMER
WINTER
SPRING
NONMIGRATORY POPULATION
WINTER
Monarch Migration
Spring & Fall
LEGEND
Overwintering areas
Spring breeding areas
Spring & summer breeding areas
Summer breeding areas
No milkweed - no breeding area
Nonmigratory population
Fall migration
Spring migration
Unconfirmed migration
Northern limit of milkweed
Potential monarch breeding habitat
THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

Total Area Occupied by Monarch Colonies at Overwintering Sites in Mexico



Data for 1994-2003 collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Natural Protected Areas (CONANP) in Mexico. Data for 2004-2017 collected by World Wildlife Fund Mexico in coordination with the Directorate of the MBBR.

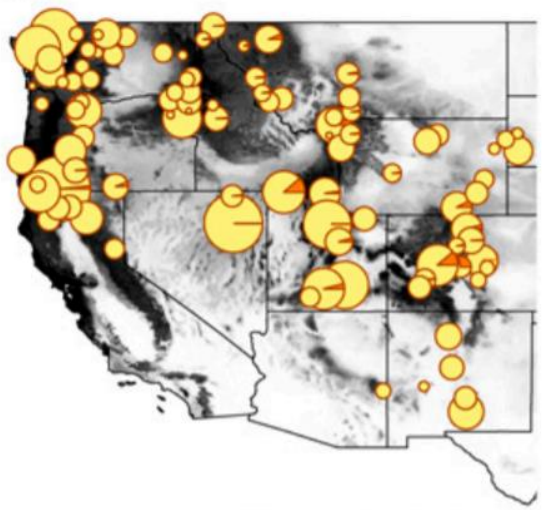
* Represents colony sizes measured in November of 2003 before the colonies consolidated. Measures obtained in January 2004 indicated the population was much smaller, possibly 8-9 hectares. CT

Patterns of widespread decline in North American bumble bees

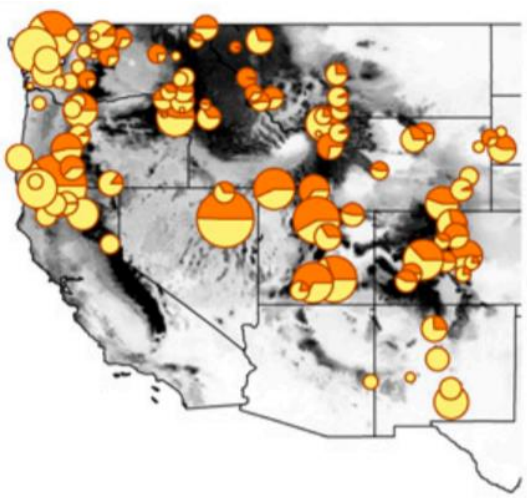
Sydney A. Cameron[a,1], Jeffrey D. Lozier[a], James P. Strange[b], Jonathan B. Koch[b,c], Nils Cordes[a,2], Leellen F. Solter[d], and Terry L. Griswold[b]

[a]Department of Entomology and Institute for Genomic Biology, University of Illinois, Urbana, IL 61801; [b]United States Department of Agriculture-Agricultural Research Service Pollinating Insects Research Unit, Utah State University, Logan, UT 84322; [c]Department of Biology, Utah State University, Logan, UT 84321; and [d]Illinois Natural History Survey, Institute of Natural Resource Sustainability, University of Illinois, Champaign, IL 61820

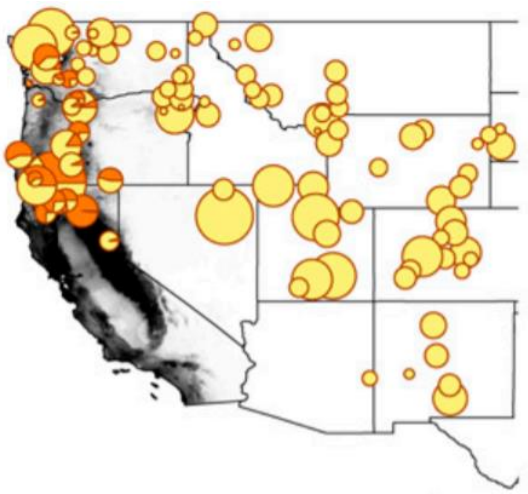
Edited* by Gene E. Robinson, University of Illinois, Urbana, IL, and approved November 24, 2010 (received for review October 3, 2010)



B. occidentalis



B. bifarius



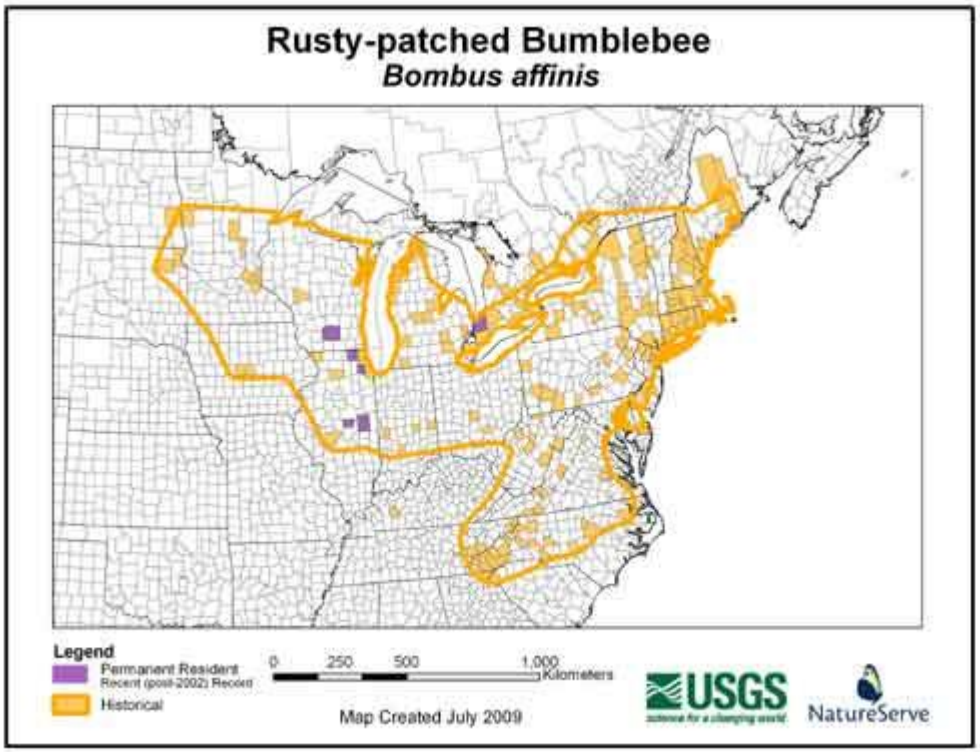
B. vosnesenskii

Historical range maps from museum collections in grayscale shading;
Data from current collections in pie charts

B. occidentalis

B. bifarius

B. vosnesenskii



Rusty-patched bumble bee
(*Bombus affinis)*

- One of the most common species of bumble bee in southern Ontario as recently as the 1980s
- Now on the brink of extinction throughout its large range.
- Has not been observed in Canada since 2009.

Wildlife: Where Have All the Bumble Bees Gone?

By Bryan Walsh @bryanrwalsh | Jan. 03, 2011 | Add a Comment

Scientists call it the Beepocalyspe. (OK, not scientists, but I like to call it that.) In late 2006, whole hives of honey bees began dying overnight for reasons that are still unclear. Scientists called it colony-collapse disorder (CCD), and it's as scary as it is mysterious. Adult bees simply leave the hive, ostensibly in search of pollen, only to die somewhere in the open. Reported death rates in bee colonies in the U.S. were 29% in 2009 and rose to 34% in 2010. (Data from the Department of Agriculture's CCD Progress Report—download a PDF here.) It's still unclear what's behind CCD—recent studies have suggested that it might be due to a combination of viral and fungal infections—but there's no doubt about the impact that sustained bee loss would have on the agricultural sector. About 130 crops in the U.S. —worth some $15 billion a year—depend on pollination from the honeybee alone in the U.S., and it's scary to think what might happen to the world food supply if CCD can't be curbed.

Get ready for more bad news—it's not just the honeybees that are disappearing. North American bumble bees have been steadily dwindling, vanishing from their long-established habitat. Bumble bees aren't as well-known as honeybees, but they're important pollinators as well, especially for tomatoes and berries. While there have

Use of common pesticide linked to bee colony collapse

For immediate release: Thursday, April 5, 2012

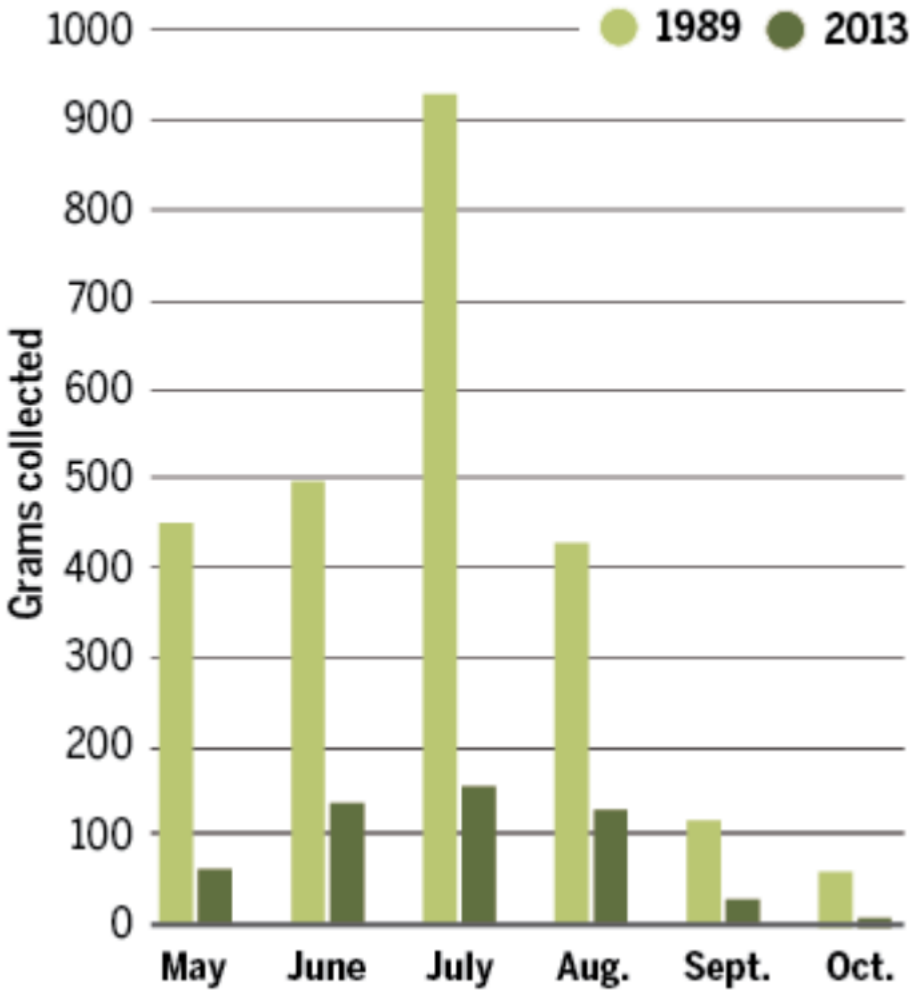
Boston, MA – The likely culprit in sharp worldwide declines in honeybee colonies since 2006 is imidacloprid, one of the most widely used pesticides, according to a new study from Harvard School of Public Health

Insects in general: Malaise trap

A large, tent-like structure used for trapping flying insects, particularly Hymenoptera and Diptera.

Insects fly into the tent wall and are funnelled into a collecting vessel attached to highest point.

The mass of insects collected by monitoring traps in the Orbroicher Bruch nature reserve in northwest Germany dropped by 78% in 24 years.



(GRAPHIC) G. GRULLÓN/*SCIENCE*; (DATA) M. SORG *ET AL.*, MITTEILUNGEN

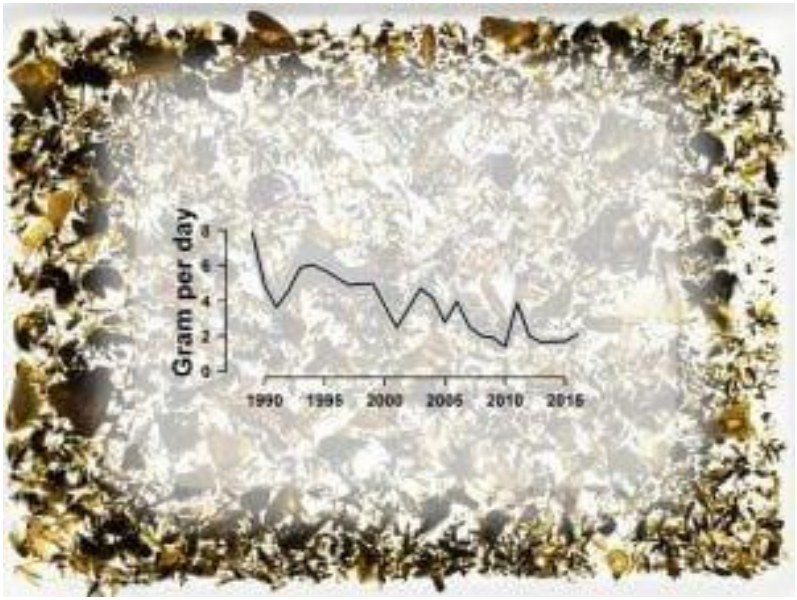
Western Germany:

Researchers used malaise traps at 63 sites across western Germany, including grasslands, swamps, sand dunes, wastelands, shrub land and along the margins of human settlement.

All of the locations were protected areas.

They recorded a 76 percent decline in insect mass from **1989 to 2016**.

The midsummer loss during the 27-year-period was as high as 82 percent.



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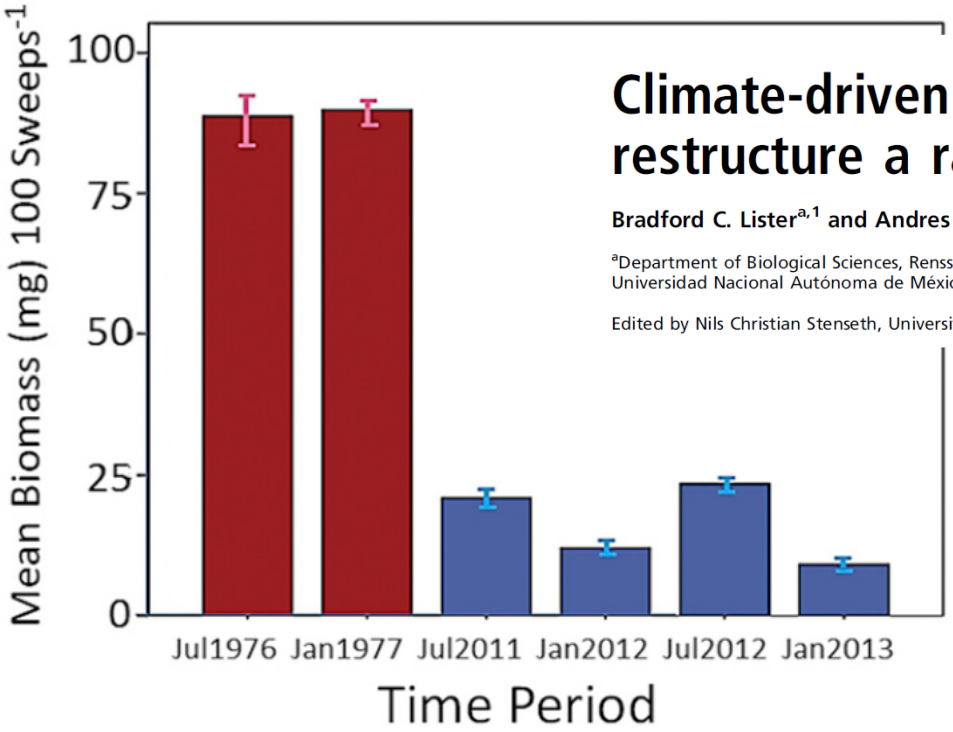
Thursday, October 19, 2017 by: Mike Adams
Tags: Collapse, ecological collapse, Ecology, food supply, habitat, insect biomass, insects, pollinators, science

32K VIEWS

A report on the German study:

"**human populations will also collapse within just a few years**"



Climate-driven declines in arthropod abundance restructure a rainforest food web

Bradford C. Lister[a,1] **and Andres Garcia**[b]

[a]Department of Biological Sciences, Rensselaer Polytechnic University, Troy, NY 12180; and [b]Estación de Biología Chamela, Instituto de Biología, Universidad Nacional Autónoma de México, 47152 Chamela, Jalisco, Mexico

Edited by Nils Christian Stenseth, University of Oslo, Oslo, Norway, and approved September 10, 2018 (received for review January 8, 2018)

Fig. 2. Mean dry-weight arthropod biomass per 100 sweeps taken in the same sample area in the Luquillo rainforest during July 1976, January 1977, July 2011, and January 2013. One SE around the mean biomass is shown for each bar. Total sweeps taken in each period was 800, except for July 1976

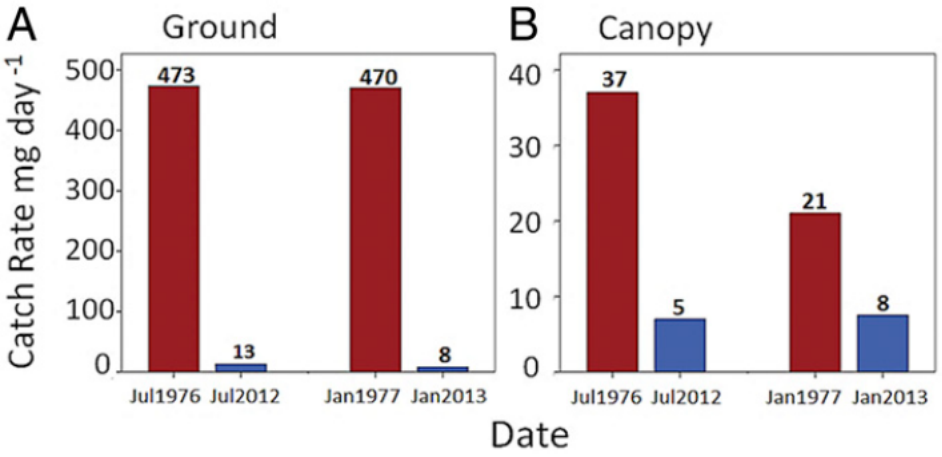


Fig. 4. Comparison of the average dry-weight biomass of arthropods

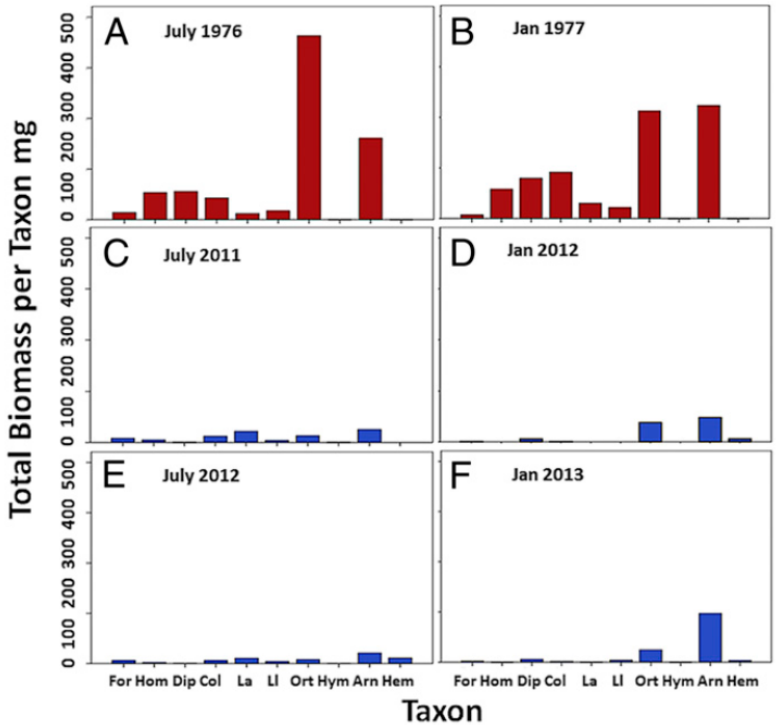


Fig. 3. Comparison of total dry-weight biomass for the major arthropod taxa captured in sweep samples taken during the summer (*A*, *C*, and *E*) and winter (*B*, *D*, and *F*) seasons 1976–1977 and 2011–2013, within the same Luquillo forest study area. Arn, Areneida; Col, Coleoptera; Dip, Diptera; For, Formicidae; Hem, Hemiptera; Hom, Homoptera; Hym, other Hymenoptera; La, Lepidoptera adults; Ll, Lepidoptera larvae; Ort, Orthoptera.

Britain:

British insect species that have disappeared in the past 50 years include

- 88 beetles
- 75 butterflies and moths
- 23 bees
- 43 fly species
- 14 bugs and hoppers
- 12 wasps

Where have all our insects gone?

There is a crisis in the countryside – and a massive decline in insect numbers could have significant consequences for the environment
by Robin McKie, Observer science editor

- Native ladybird populations are crashing;
- Three quarters of butterfly species – such as the painted lady and the Glanville fritillary – have dropped significantly in numbers;
- Bees, of which there are more than 250 species in the UK, are also suffering major plunges in populations, with great yellow bumblebees, solitary potter flower bees and other species declining steeply in recent years.
- Other threatened insects include the New Forest cicada, the tansy beetle and the oil beetle.
- For moths, the picture is particularly alarming. Apart from the tiger moth, which was once widespread in the UK, the V-moth (*Marcaria wauaria*) recorded a 99% fall in numbers between 1968 and 2007 and is now threatened with extinction, a fate that has already befallen the orange upperwing, the bordered gothic and the Brighton wainscot in recent years.

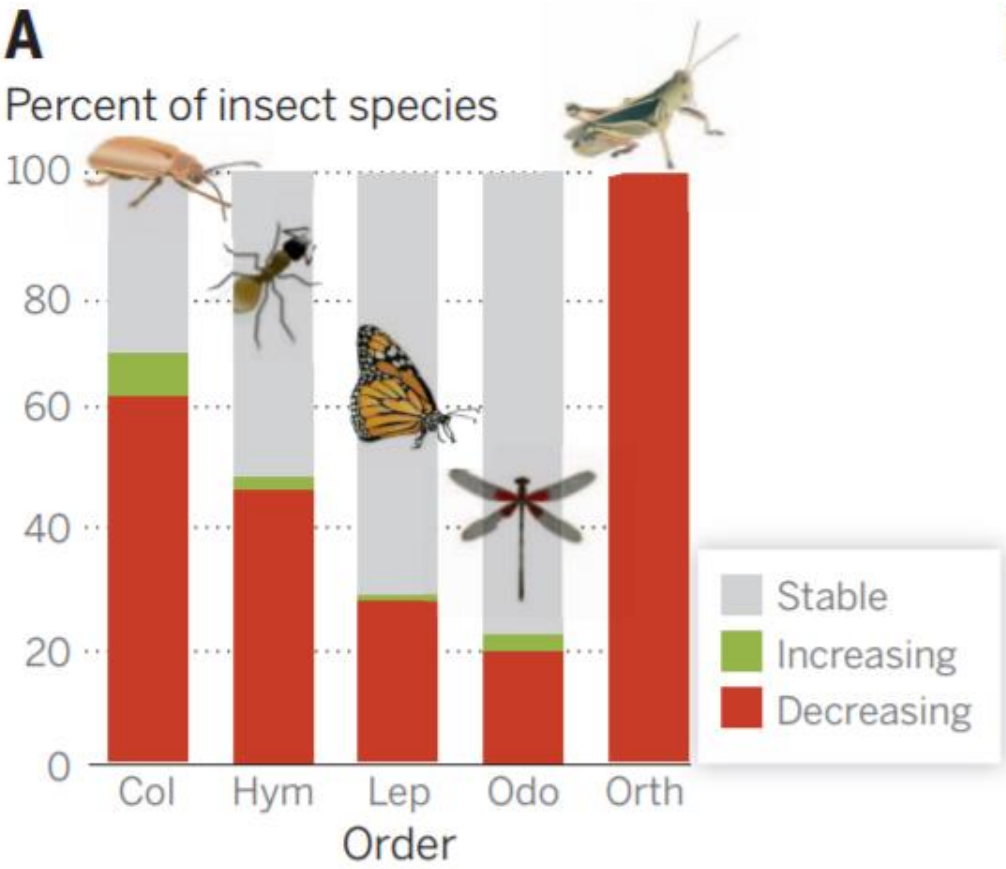
Insect population decline leaves Australian scientists scratching for solutions

ABC Far North By Mark Rigby

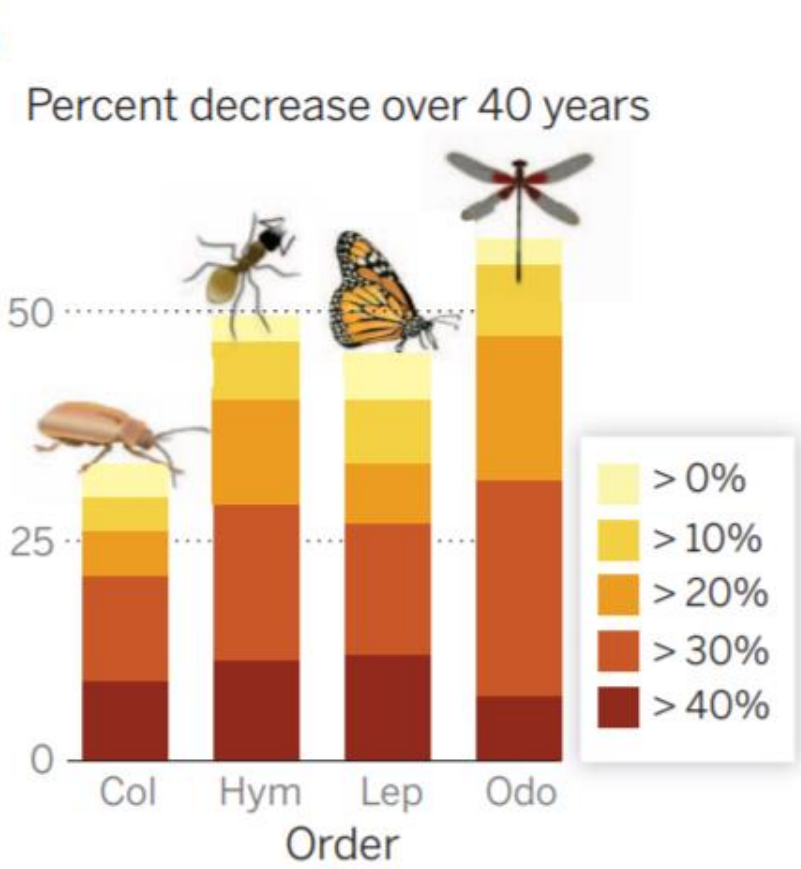
Updated 23 Feb 2018, 8:50pm

PHOTO: Entomologists are concerned Australia's insect populations are in decline.
(ABC News: Penny McLintock)

Of all insects with IUCN-documented population trends, 33% are declining



Global

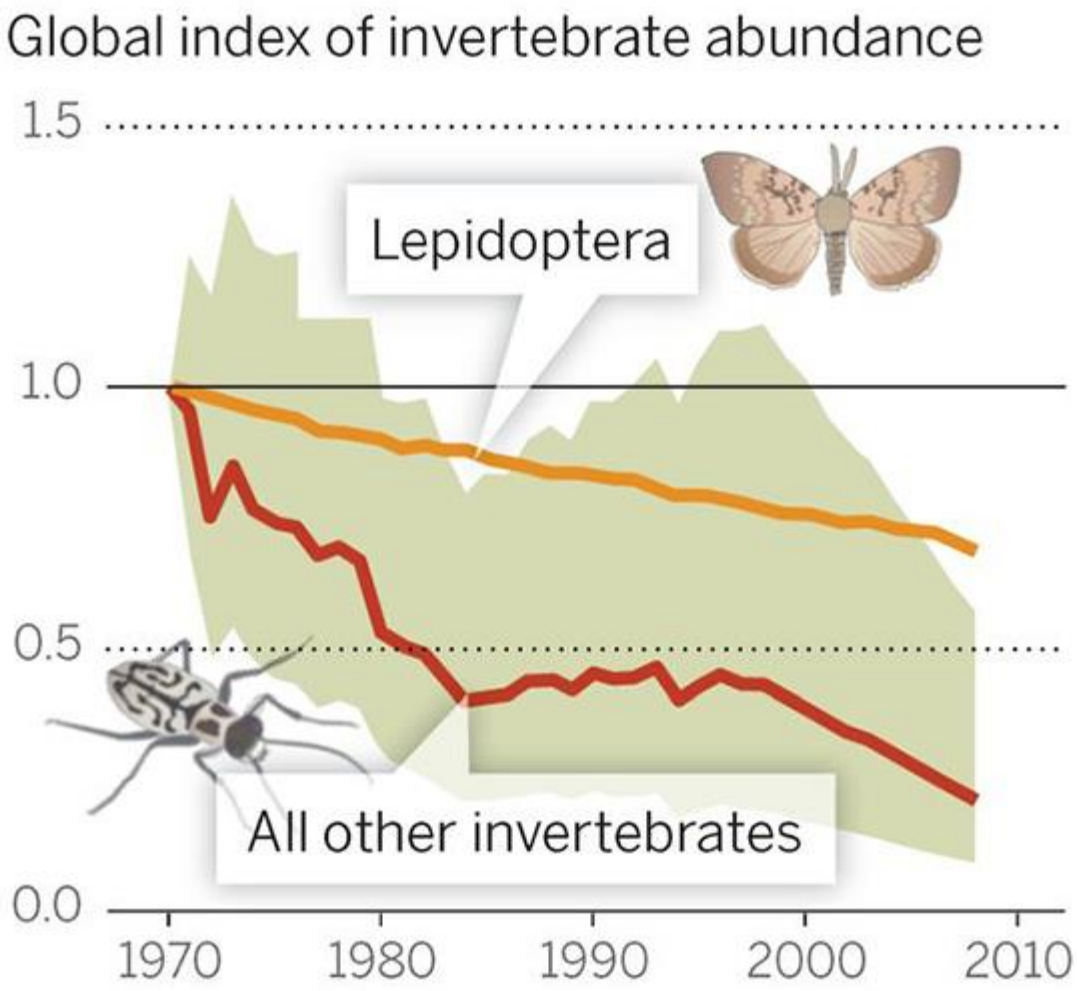


U.K.

REVIEW

Defaunation in the Anthropocene

Rodolfo Dirzo,[1]* Hillary S. Young,[2] Mauro Galetti,[3] Gerardo Ceballos,[4] Nick J. B. Isaac,[5] Ben Collen[6]

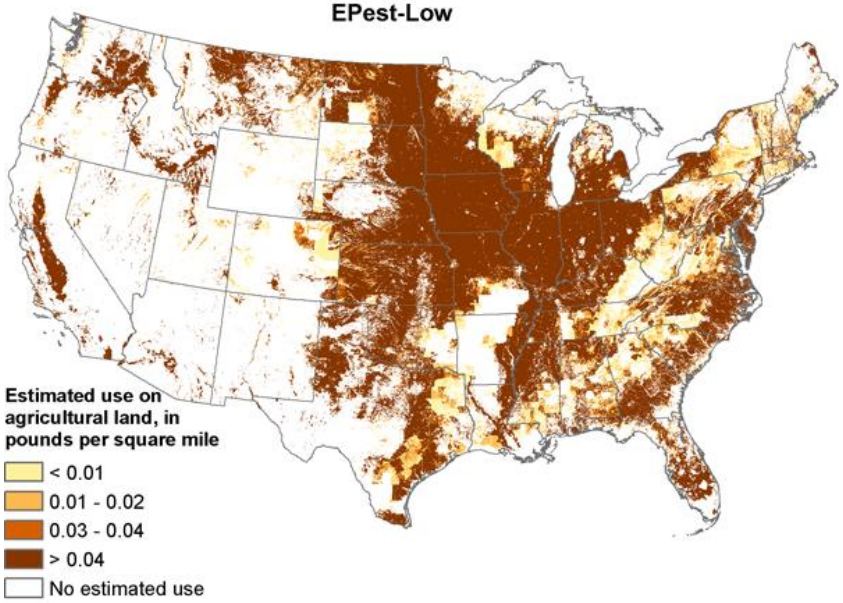


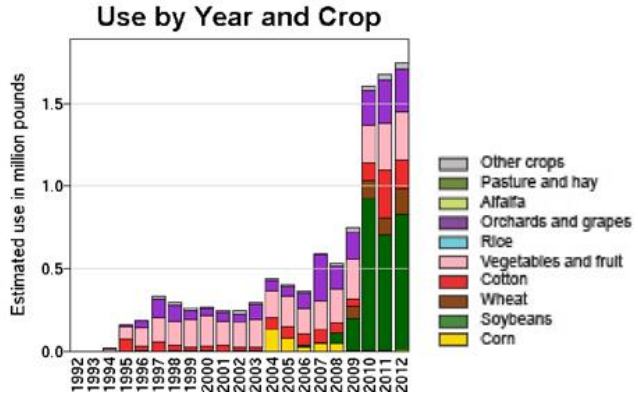
According to global monitoring data for 452 species, there has been a 45 percent decline in invertebrate populations over the past 40 years. DIRZO, *SCIENCE* (2014)

Neonicotinoids

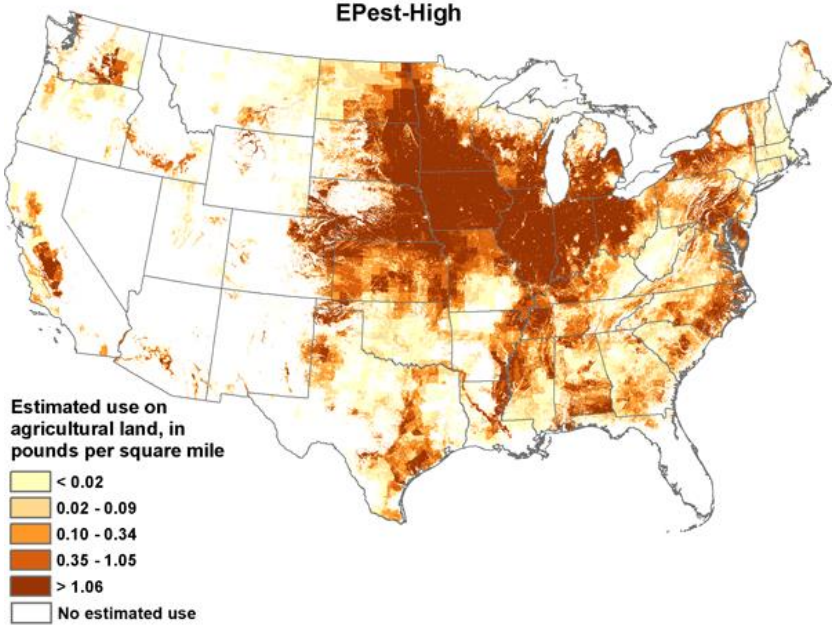
- Systemic insecticides. Examples: clothianidin and imidacloprid (Bayer)
- Cause paralysis by interacting with Nicotinic Acid Receptors in the brain. Highly specific for insects.
- Applied as soil or seed treatments to potatoes and cereal crops
- For control of Colorado potato beetle, leafhoppers, potato psyllids, aphids, and flea beetles.
- Also sold to home gardeners and used at high concentrations
- Very stable (half-life ~1000 days)
- Water-soluble
- Now the most widely used pesticides in the world
- Systemic: taken up INSIDE the plant
- From soil or seed treatments they can cause both nectar and pollen to become toxic.
- Strongly implicated in pollinator declines worldwide.

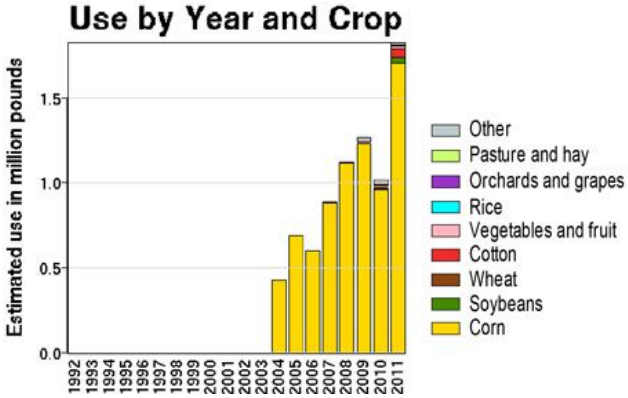
Estimated Agricultural Use for Imidacloprid, 2012





Estimated Agricultural Use for Clothianidin , 2011





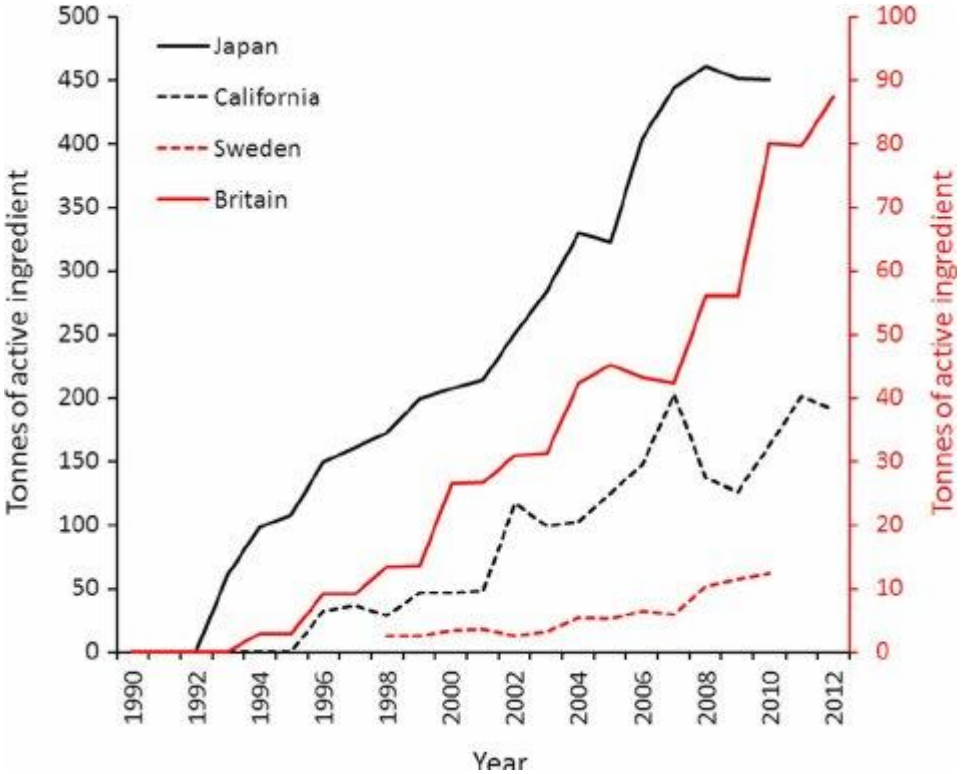


Fig. 3 Trend in the sales (Sweden), domestic shipment (Japan), use (California) and agricultural use (Britain) of all neonicotinoid insecticides and fipronil. See Figs. 2a – d for further details. All measured in tonnes of active ingredient per year. Note the separate vertical axes for California// Japan, and Britain//Sweden

How you can help: Do Not Use:

Neonicotinoids:

Systemic insecticides that make pollen and nectar toxic to insects

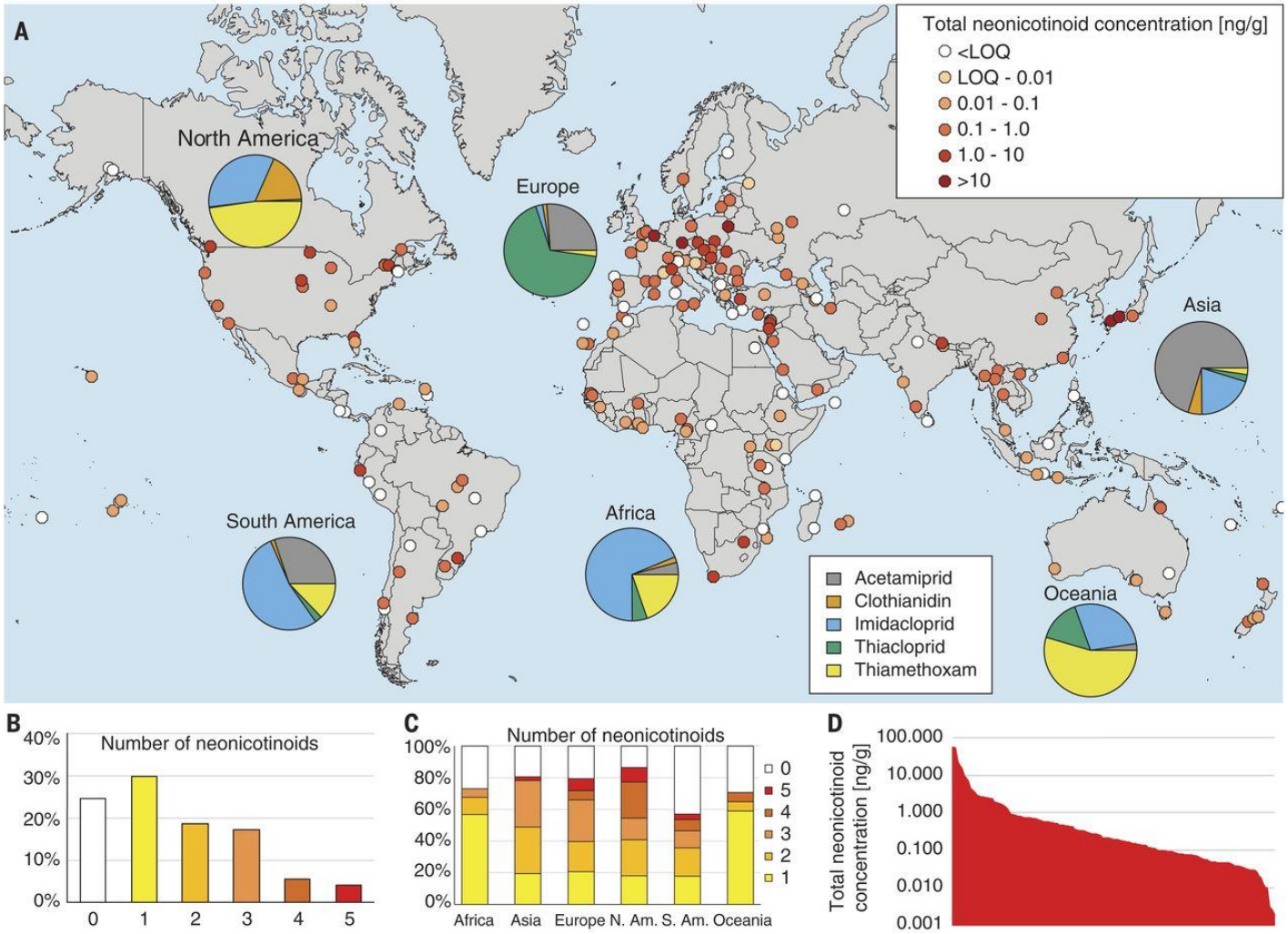
Acetamiprid...Clothianidin...Dinotefuran... Imidacloprid...Thiamethoxam

These chemicals are killing bees. If you see any of these ingredients listed on products in your home or your local garden center, do not use them.

NEONICS HIDE IN THESE POPULAR BRANDS:

• Aloft • Arena • Allectus • Atera • Bithor • Caravan
• Coretect • Derby • Dino • Dominion • Equiladonis
• Flagship • Flower, Rose, & Shrub Care
• Gaucho • Grub-No-More • Grubex • Grubout
• Hawk • Imaxxpro • Ima-Jet • Imi Insecticide
• Imicide • Imid-Bifen • Imida-Teb Garden SC
• Imidapro • Imigold • Lada • Malice • Mallet
• Mantra • Marathon • Meridian • Merit
• Nuprid • Optigard Flex • Pasada • Pointer
Insecticide • Premise • Pronto • Prothor • Safari
• Sagacity • Starkle: Bounty • Tandem • Temprid
• Triple Crown Insecticide • Tristar • Turfthor • Xytect

Fig. 1 Worldwide contamination of honey by neonicotinoids.



E. A. D. Mitchell et al. Science 2017;358:109-111

Science
AAAS

Published by AAAS

Pesticides

EU agrees total ban on bee-harming pesticides

The world's most widely used insecticides will be banned from all fields within six months, to protect both wild and honeybees that are vital to crop pollination

27 April, 2018

Friends of the Earth Calls for US EPA to Ban Neonicotinoid Pesticides

January 13, 2017 kayadmin farmgarden, national, news

Source: Honeybee photo via www.ces.ncsu.edu.

U.S. Fish and Wildlife Service Bans GMOs and Neonicotinoid Insecticides

Refuge News | by National Wildlife Refuge Association | August 8, 2014

In support of their mission to conserve wildlife, Jim Kurth, Chief of the Refuge System has boldly made the decision to ban genetically modified crops and neonicotinoid insecticides from being used on national wildlife refuges across the country. This decision was based purely on what is best for wildlife management and the National Wildlife Refuge System's Policy on Biological Integrity.

For Immediate Release, August 4, 2018

Contact: Hannah Connor, (202) 681-1676, hconnor@biologicaldiversity.org

Trump Administration to Abruptly End Ban on Bee-killing Pesticides on National Wildlife Refuges

Also Reverses Ban on Genetically Modified Crops in Refuges

WASHINGTON— The Trump administration's U.S. Fish and Wildlife Service has announced it plans to reverse a 2014 national wildlife refuge system ban on the use of bee-killing neonicotinoid pesticides and genetically modified crops that trigger greater pesticide use.

H.R.3040 - Saving America's Pollinators Act of 2017

115th Congress (2017-2018) | Get alerts

BILL Hide Overview ✖

Sponsor: Rep. Conyers, John, Jr. [D-MI-13] (Introduced 06/23/2017)

Committees: House - Agriculture

Latest Action: House - 07/11/2017 Referred to the Subcommittee on Biotechnology, Horticulture, and Research. (All Actions)

Tracker:

Introduced > Passed House > Passed Senate > To President > Became Law

This bill requires the Environmental Protection Agency (EPA) to suspend the registration of members of the nitro group of neonicotinoid insecticides that are registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) for use in seed treatment, soil application, or foliar treatment on bee-attractive plants, trees, and cereals until the EPA determines that the insecticides will not cause unreasonable adverse effects on pollinators. The determination must be based on:

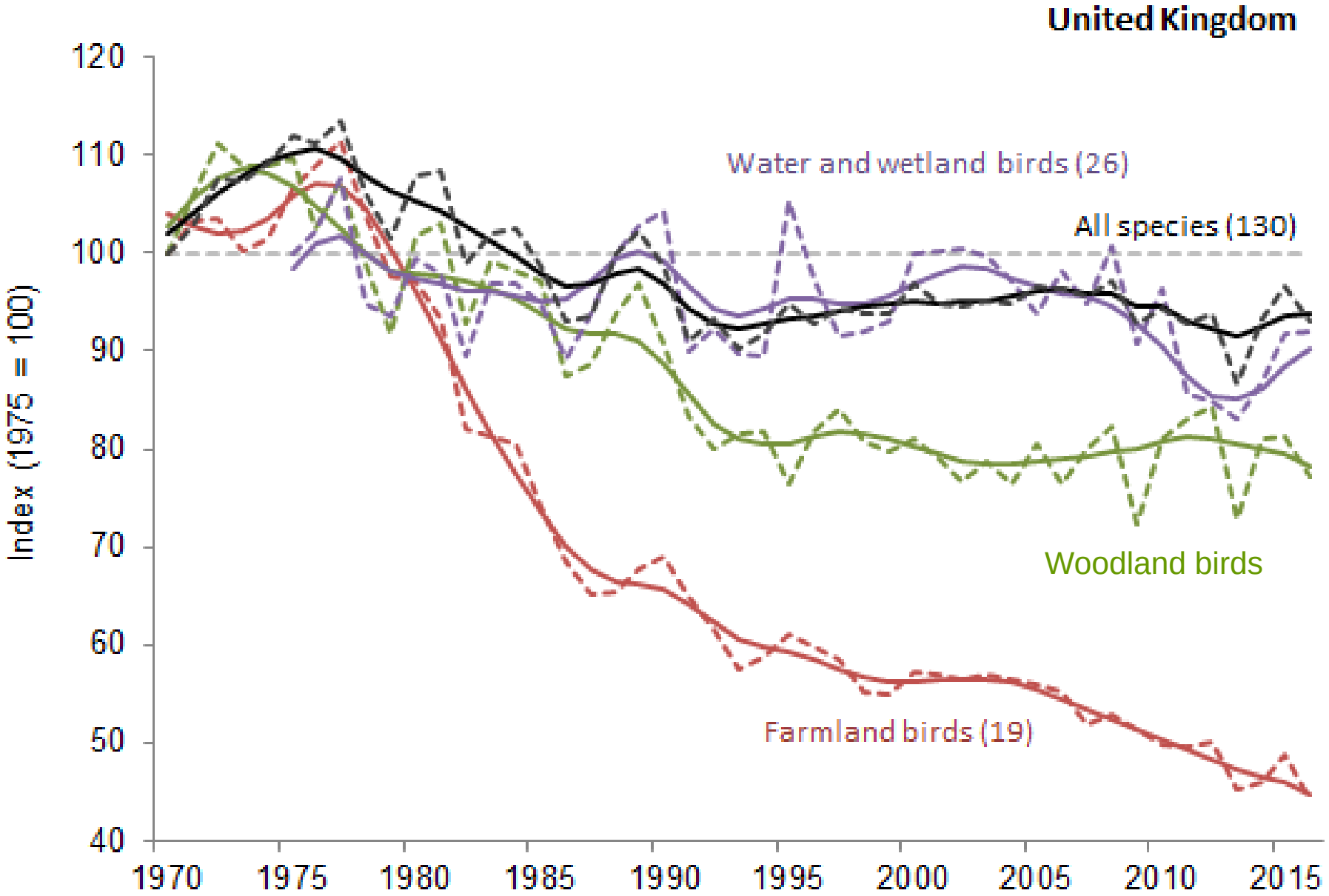
- an evaluation of the published and peer-reviewed scientific evidence on whether the use or uses of those neonicotinoids cause unreasonable adverse effects on pollinators, including native bees, honeybees, birds, bats, and other species of beneficial insects; and
- a completed field study that meets the criteria required by the EPA and evaluates residues, chronic low-dose exposure, and cumulative effects of multiple chemical exposures.

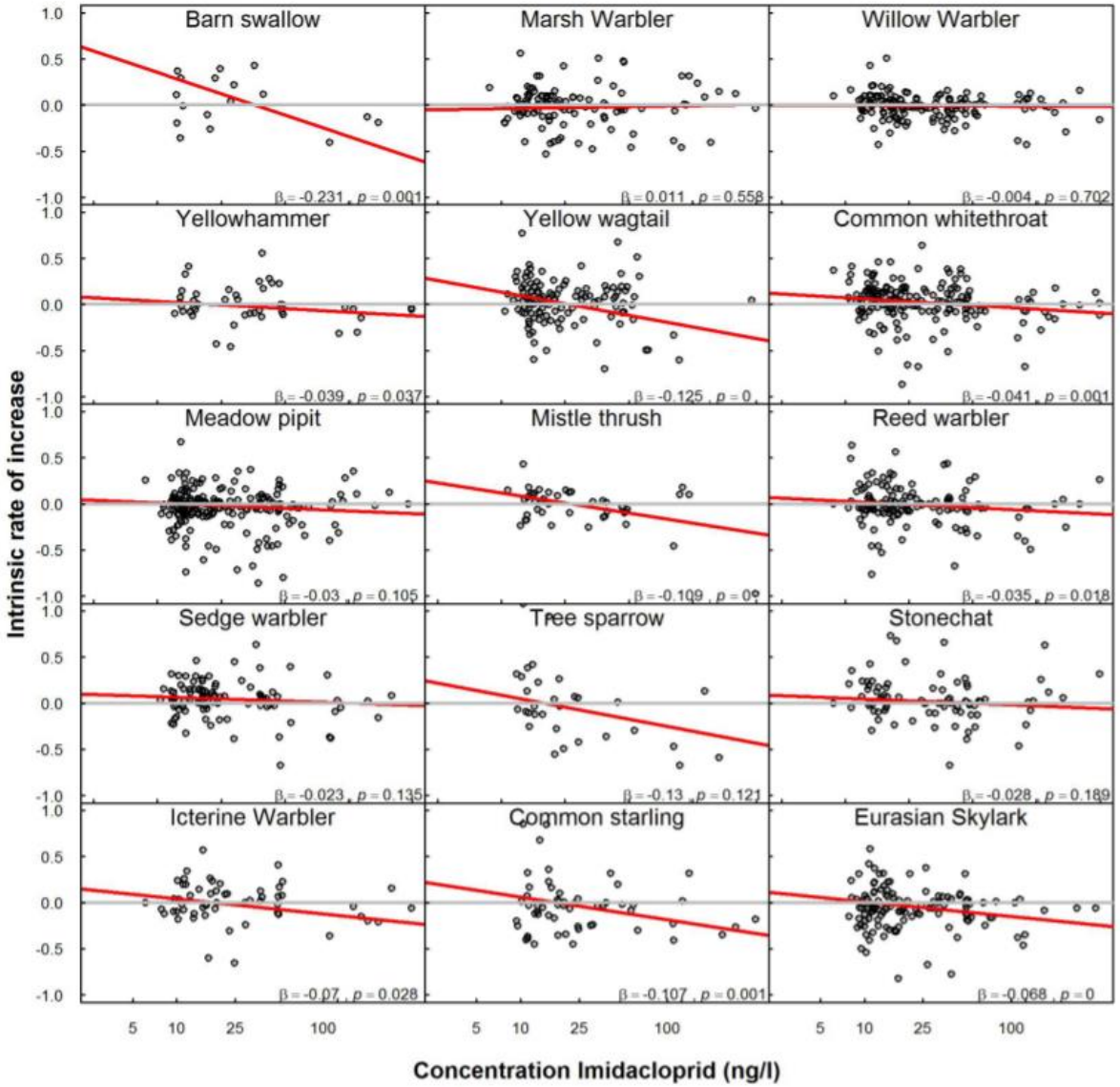
The EPA may not issue new registrations of the neonicotinoid pesticides for any seed treatment, soil application, and foliar treatment on bee-attractive plants, trees, and cereals under FIFRA until it has made the determination with respect to the insecticide.

For purposes of protecting and ensuring the long-term viability of native bees and other pollinators, the Department of the Interior must: (1) regularly monitor the health and population status of native bees, (2) identify the scope and likely causes of unusual native bee mortality, and (3) submit to Congress and make public an annual report on the health and population status of native bees.

Prognosis: 4% chance of passing according to Skopos

Wild Bird Populations in U.K.





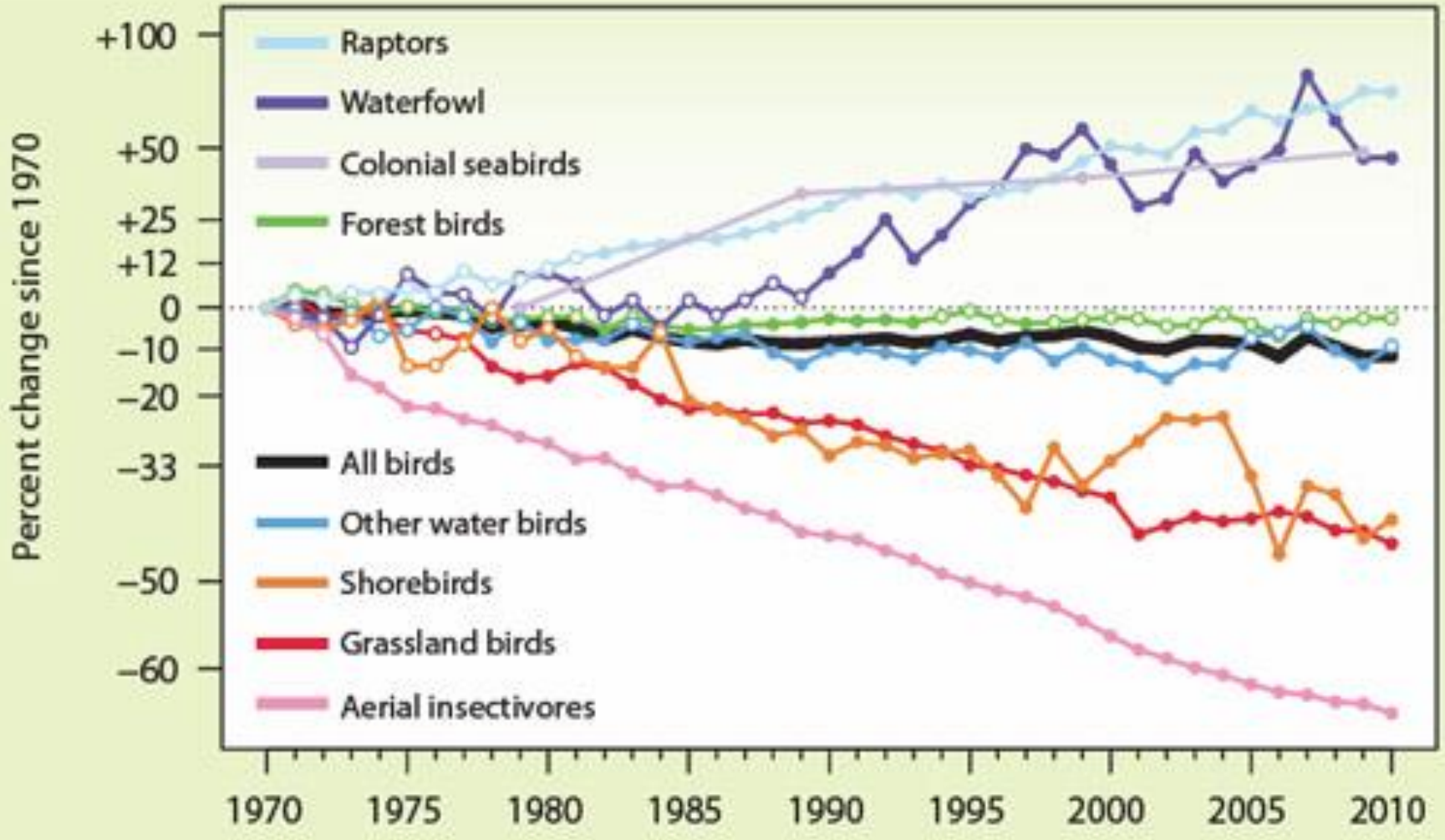
Extended Data Figure 4 | Population trends as a function of imidacloprid concentration per individual bird species. The red lines depict the weighted mean trend, also given as slope coefficients (β) and with corresponding P values.

Declines in insectivorous birds are associated with high neonicotinoid concentrations

Caspar A. Hallmann[1,2], Ruud P. B. Foppen[2,3], Chris A. M. van Turnhout[2], Hans de Kroon[1] & Eelke Jongejans[1]

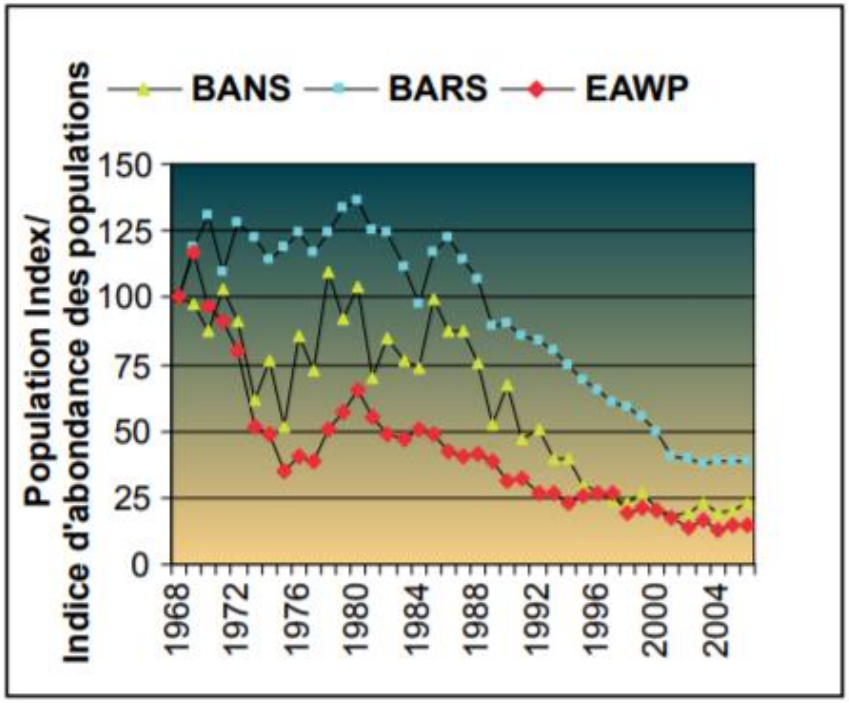
Video

(Netherlands)



Indicators of the national population status of all regularly occurring native bird species in Canada and eight selected subgroups.

From “Status of Canada's Birds, 2012”



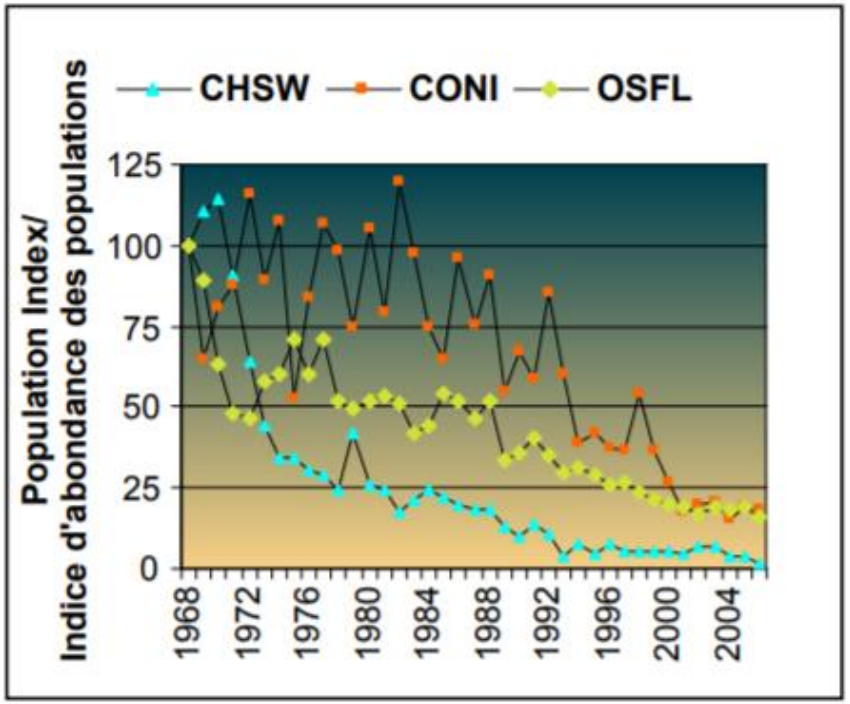


Figure 1. Annual patterns of population change for six species of severely-declining aerial insectivores in Canada, based upon results from the Breeding Bird Survey (1968-2006). Species codes are as follows: CHSW (Chimney Swift); CONI (Common Nighthawk); OSFL (Olive-sided Flycatcher); BANS (Bank Swallow); BARS (Barn Swallow); EAWP (Eastern Wood-Pewee).

Decline of aerial insectivores in Canada
(Ontario Breeding Bird Atlas)

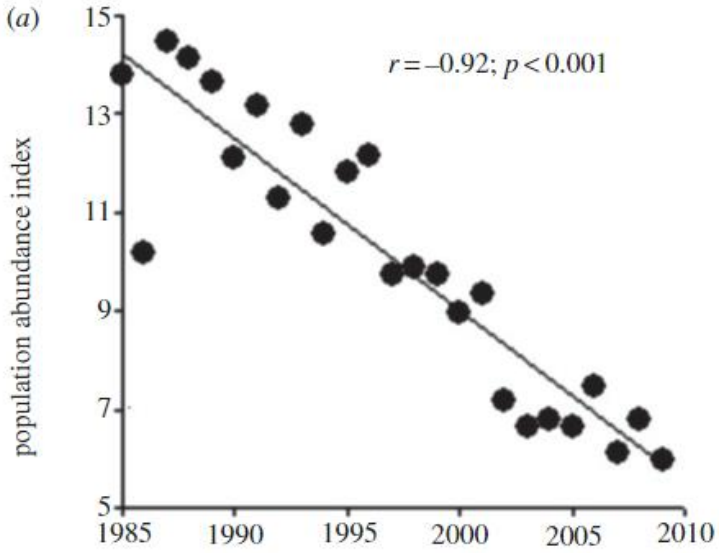


Figure 1. (*a*) Population abundance index for the tree swallow in the province of Québec, Canada, between 1985 and 2009 (data obtained from the Bird Breed-

How you can help:

1: Don’t use neonicotinoids

2: Plant larval food plants!

Monarch,
Danaus plexippus (male)

Monarch,
Danaus plexippus (female)

University Hills, Irvine, Orange County, CA. 7-29-08. © Joan Avise

Narrow-leaved milkweed

Asclepias fascicularis

Apocynaceae

Back to Apocynaceae of Orange County, California
Back to Eudicots of Orange County, California
Back to Natural History of Orange County, California

Laguna Coast Wilderness Park, Laguna Beach, CA 7-16-11. © Joan Avise

Tropical milkweed

Asclepias currassavica

Back to Apocynaceae of Orange County, California
Back to Eudicots of Orange County, California
Back to Natural History of Orange County, California

Gibbs Park, Huntington Beach, CA 7-12-09. © Joan Avise

Gibbs Park, Huntington Beach, CA 7-12-09. © Joan Avise

Swallowtails (Papilionidae)

Pipevine Swallowtail,
Battus philenor

Pale Swallowtail,
Papilio eurymedon

Western Giant Swallowtail,
Papilio rumiko

Western Tiger Swallowtail,
Papilio rutulus

Anise Swallowtail,
Papilio zelicaon

Sulphurs and Whites (Pieridae)

Sara Orangetip,
Anthocharis sara (male)

Sara Orangetip,
Anthocharis sara (female)

Harford's Sulphur,
Colias alexandra harfordii

California Dogface,
Zerene eurydice (male)

California Dogface,
Zerene eurydice (female)

Orange Sulphur (Alfalfa butterfly),
Colias eurytheme (male)

Orange Sulphur (Alfalfa butterfly),
Colias eurytheme (female)

Sleepy Orange,
Eurema nicippe

Dainty Sulfur,
Nathalis iole

Large Orange Sulphur,
Phoebis agarithe

Cloudless Sulphur,
Phoebis sennae

Cabbage White,
Pieris rapae

Checkered White,
Pontia protodice (female)

Checkered White,
Pontia protodice (male)


Biggest…
Giant swallowtail
Papilio cresphontes
Larval food plant:
Citrus, Rue

Western tiger swallowtail
Papilio rutulus

Larval foodplant:
California Sycamore

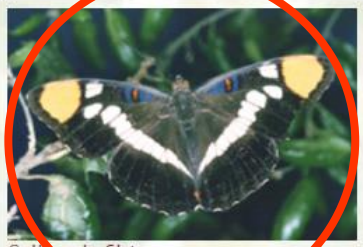
California Dogface,
Colias eurydice

Larval Foodplant: False indigo, *Amorpha californica*

Brush-footed Butterflies (Nymphalidae)

Gulf Fritillary,
Agraulis vanillae

Viceroy,
Limenitis archippus



California Sister,
Adelpha californica

Gabb's Checkerspot,
Chlosyne gabbii

Variable Checkerspot,
Euphydryas chalcedona

Lorquin's Admiral,
Limenitis lorquini

Mourning Cloak,
Nymphalis antiopa

California Tortoiseshell,
Nymphalis californica

Mylitta Crescent,
Phyciodes mylitta

Satyr Comma,
Polygonia satyrus

Common Buckeye, Junonia coenia
(= Precis coenia)

Callipe Fritillary,
Speyeria callipe comstocki

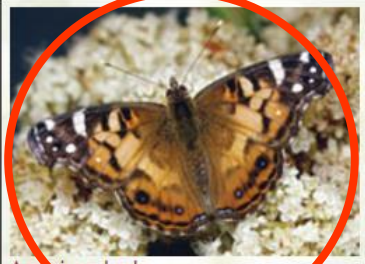
Coronis Fritillary,
Speyeria coronis semiramis

West Coast Lady,
Vanessa anabella

Red Admiral,
Vanessa atalanta

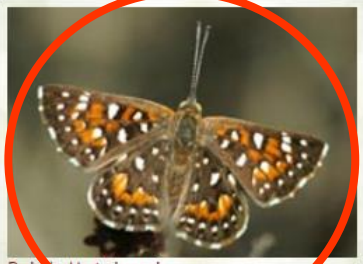
Brush-footed Butterflies (Nymphalidae, cont.)

Painted Lady,
Vanessa cardui



American Lady,
Vanessa virginiensis

Metalmarks (Riodinidae)



Behr's Metalmark,
Apodemia virgulti

Fatal Metalmark,
Calephelis nemesis

Wright's Metalmark,
Calephelis wrighti

California Sister

Larval Foodplant: California Live Oak

Larval Foodplant: Willow

Buckeye,
Precis coenia

Bush Monkey Flower
Mimulus aurantiacus

Virginia lady,
Cynthia virginiensis

California Sagebrush
Artemisia californica

Blues, Coppers and Hairstreaks (Lycaenidae)

Great Purple Hairstreak,
Atlides halesus

Pygmy Blue,
Brephidium exilis

Bramble Hairstreak,
Callophrys dumetorum

Echo Blue,
Celastrina argiolus

Western Tailed-Blue,
Cupido amyntula

Silvery Blue,
Glaucopsyche lygdamus

Golden Hairstreak,
Habrodais grunus

Hedgerow Hairstreak,
Satyrium saepium

Reakirt's Blue,
Hemiargus isola

Brown Elfin,
Callophrys augustinus

Marine Blue,
Leptotes marina

Tailed Copper,
Lycaena arota

Gorgon Copper,
Lycaena gorgon

Purplish Copper,
Lycaena helloides (male)

Purplish Copper,
Lycaena helloides (female)

Square-spotted Blue,
Euphilotes battoides

Sonoran Blue,
Philotes sonorensis

Acmon Blue,
Plebejus acmon

Boisduval's Blue,
Plebejus icarioides

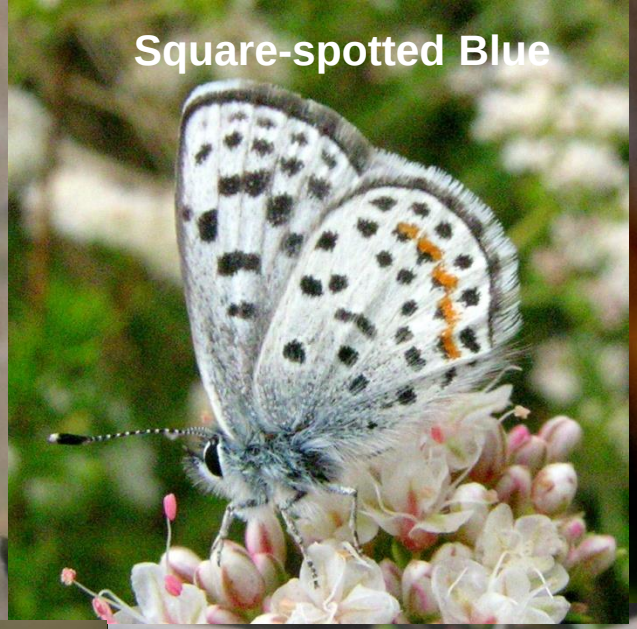
Sylvan Hairstreak,
Satyrium sylvinus

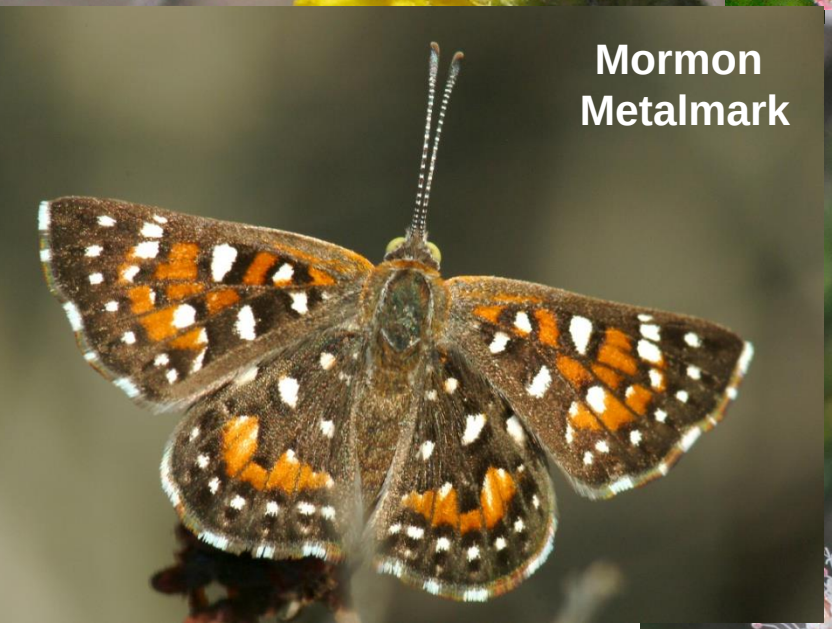
Gray Hairstreak,
Strymon melinus

Avalon Scrub Hairstreak,
Strymon avalona

Great Purple Hairstreak,
Atlides halesus corcorani

Larval foodplant: Mistletoe





Larval Foodplant:
California Buckwheat

Funereal Duskywing

Silvery Blue

Acmon Blue

Larval Foodplant: Deerweed