The Vermont Atlas of Life

Uniting People and Biodiversity Data for Conservation

VERMONT CENTER FOR ECOSTUDIES

Uniting People and Science for Conservation

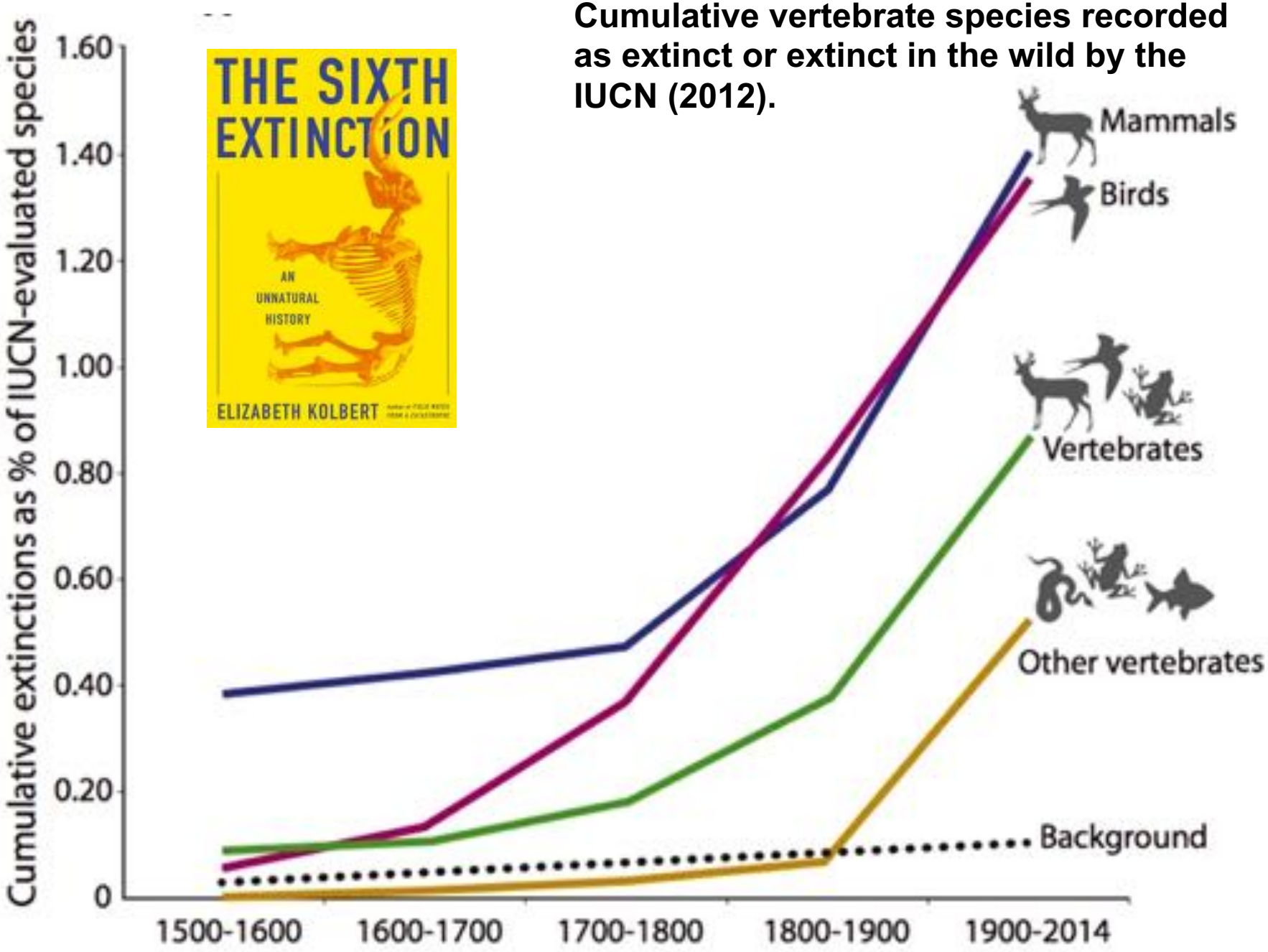
Vermont Center for Ecostudies advances conservation of wildlife across the Americas through research, monitoring, and citizen engagement. We deliver the science people need to make good decisions for wildlife.

Presentation for the House Committee on Natural Resources, Fish and Wildlife
H.606 - Community Resilience and Biodiversity Protection Act

Kent McFarland, M.S.
Conservation Biologist and Director of the Vermont Atlas of Life

val.vtecostudies.org

Cumulative vertebrate species recorded as extinct or extinct in the wild by the IUCN (2012).



Accelerated modern human–induced species losses: Entering the sixth mass extinction. *Science Advances* 19 Jun 2015: Vol. 1, no. 5, e1400253. DOI: 10.1126/sciadv.1400253

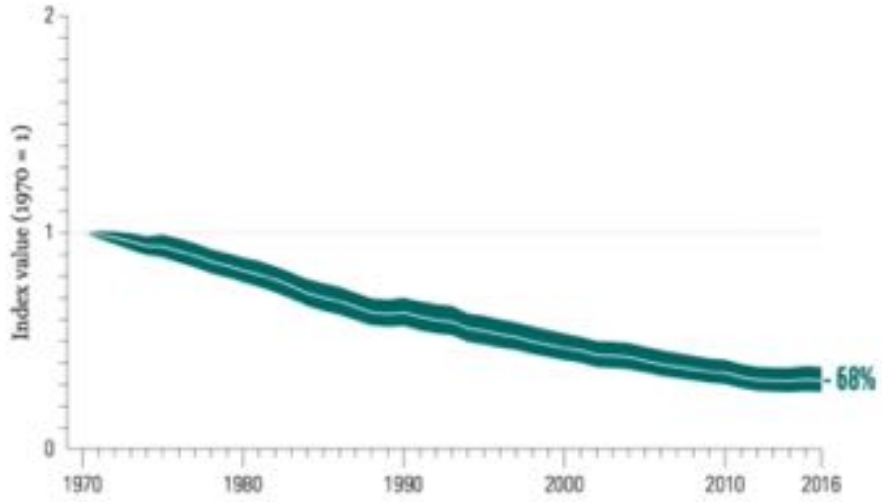
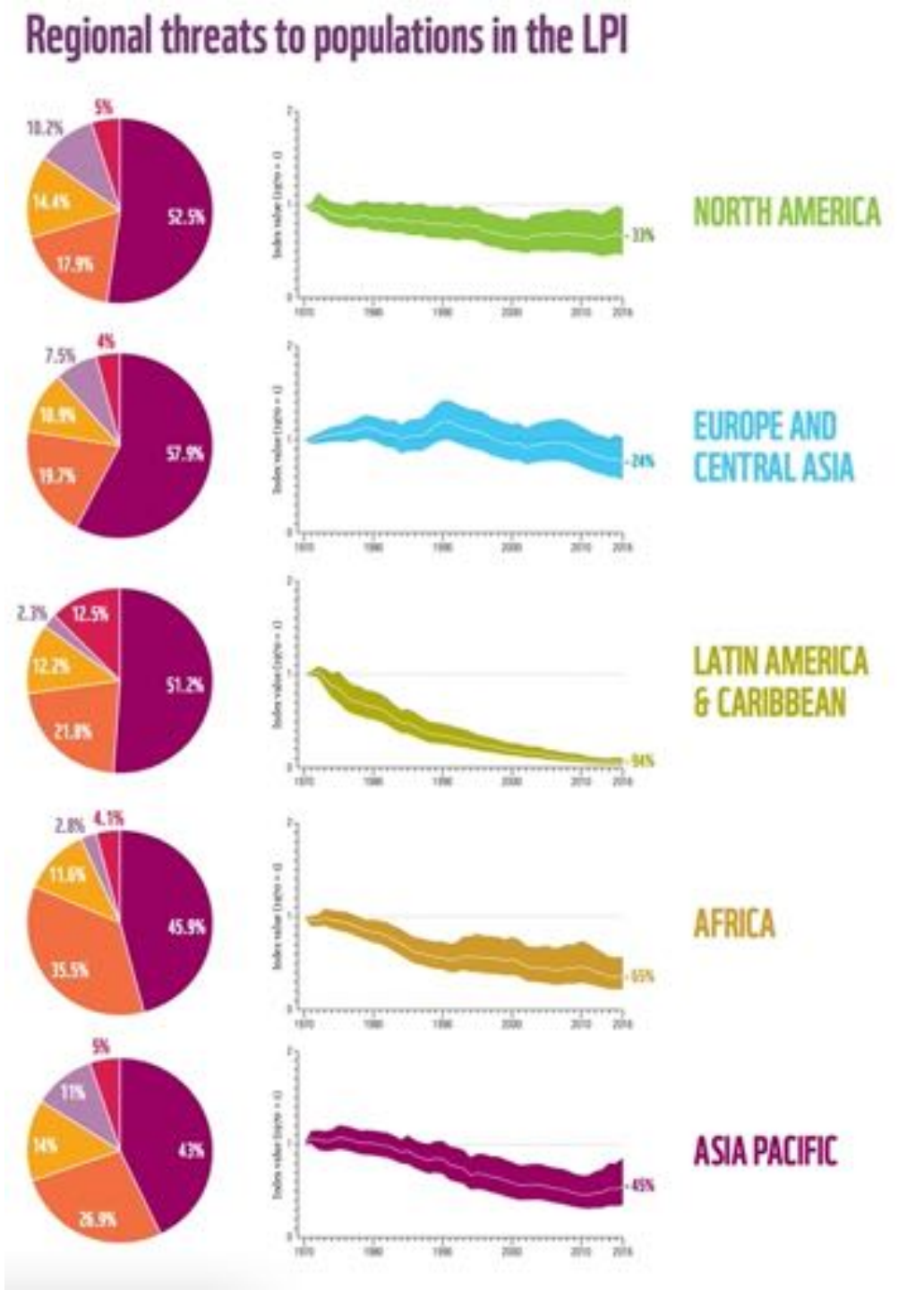


Figure 1: The global Living Planet Index: 1970 to 2016
Average abundance of 20,811 populations representing 4,392 species monitored across the globe declined by 68%. The white line shows the index values and the shaded areas represent the statistical certainty surrounding the trend (range: -73% to -62%). Sourced from WWF/ZSL (2020)[1].

Key

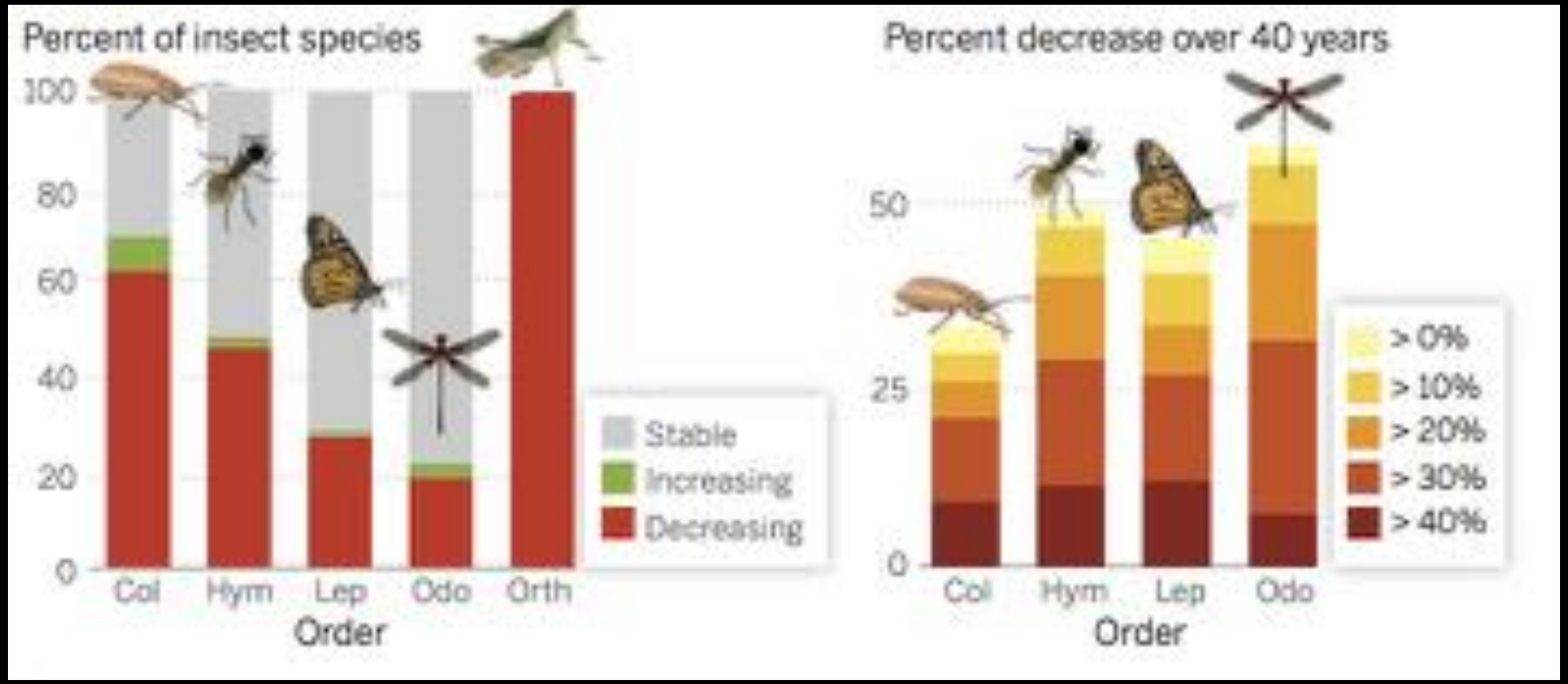
Global Living Planet Index

Confidence limits



IUCN list of species with trend data

UK insects with trends >40 years

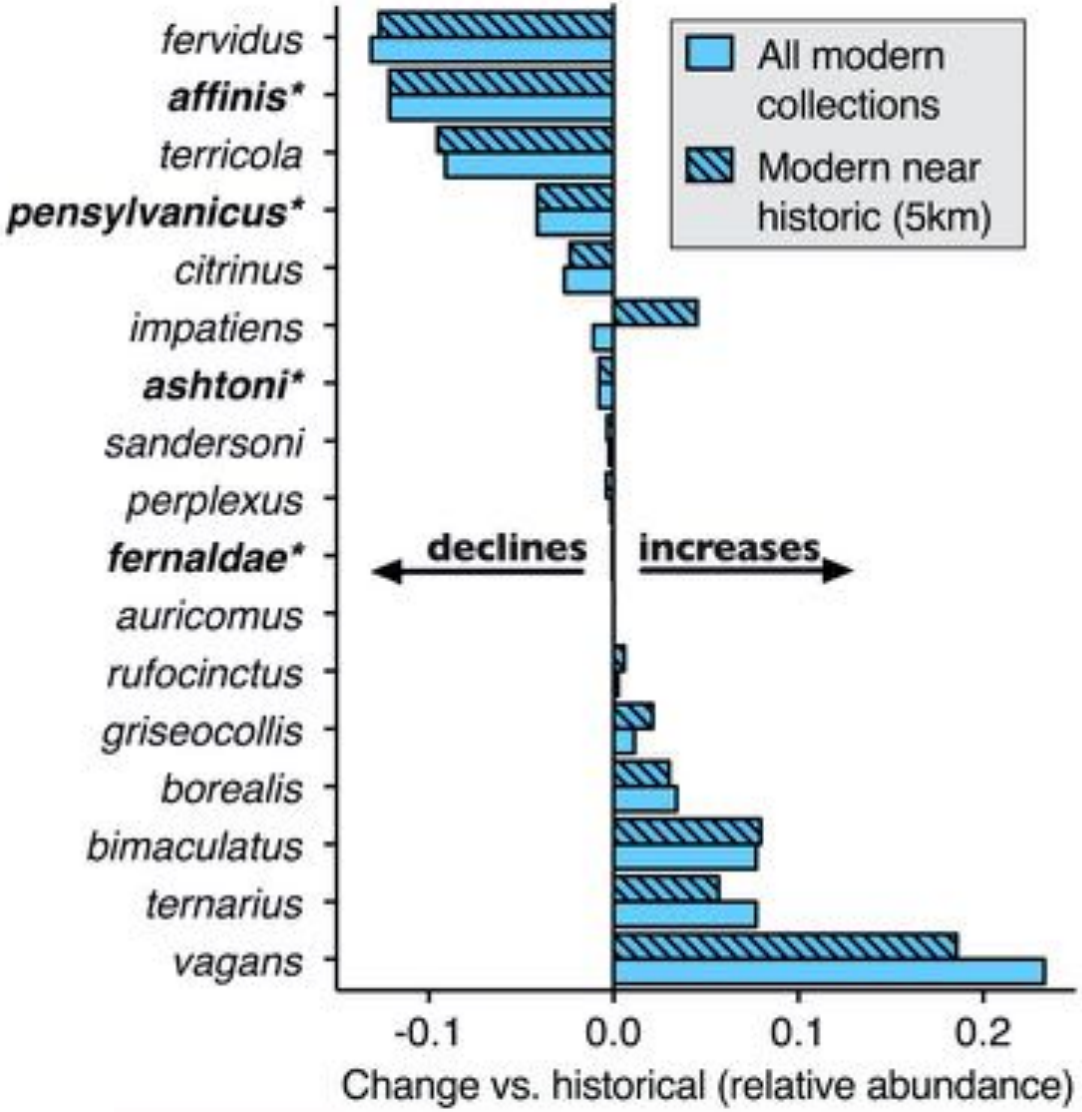


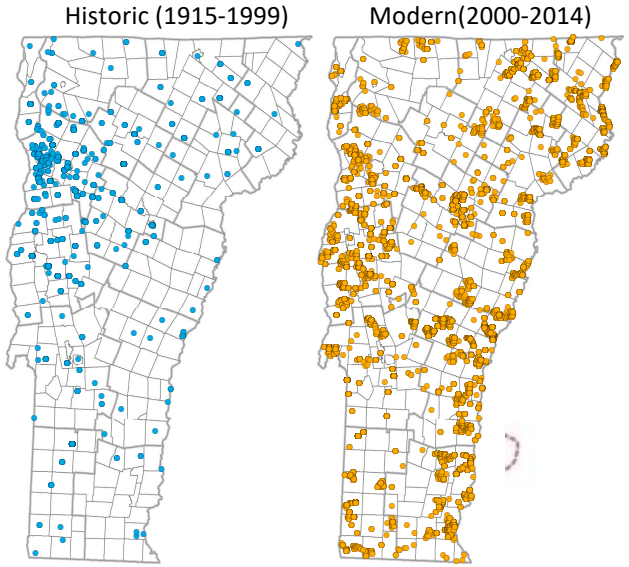
Defaunation in the Anthropocene
Rodolfo Dirzo *et al.*
Science **345**, 401 (2014);
DOI: 10.1126/science.1251817

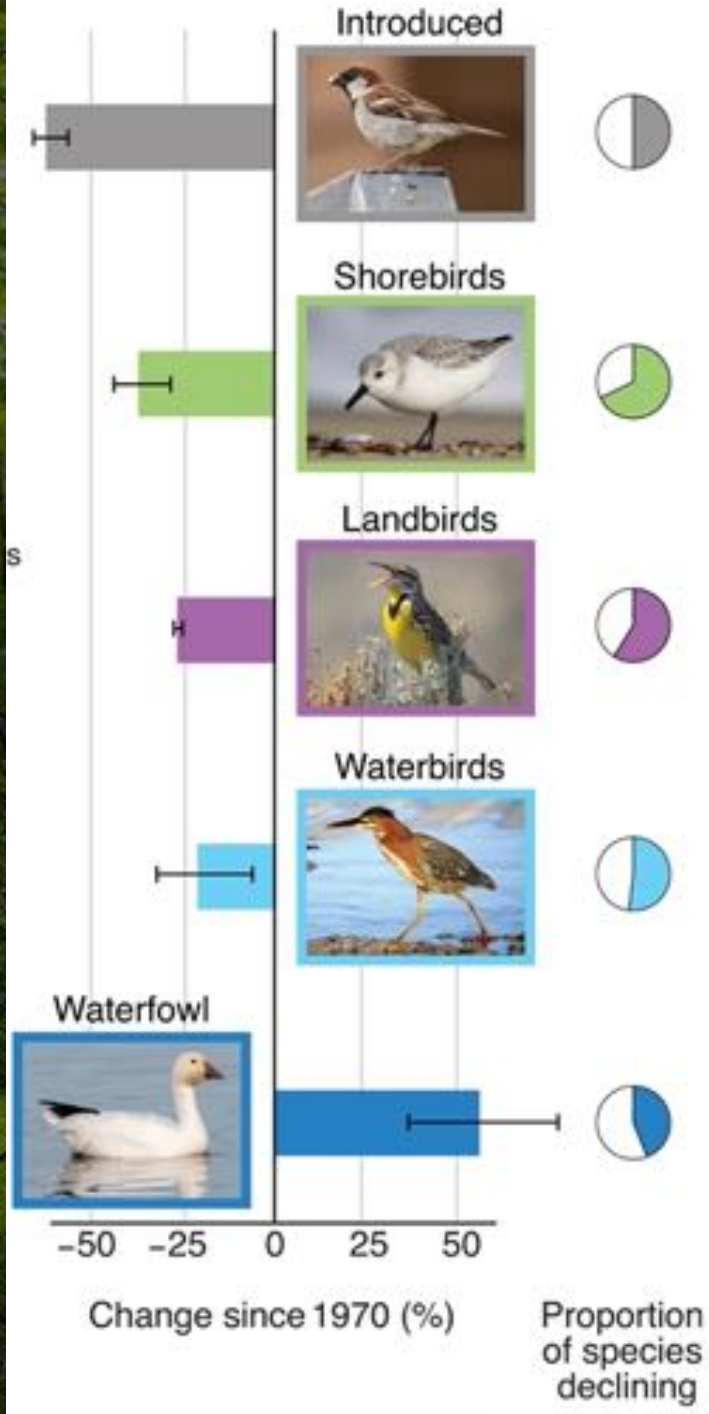
Bumble Bee (*Bombus*) Distribution and Diversity in Vermont, USA: A Century of Change

VERMONT CENTER FOR ECOSTUDIES
Uniting People and Science for Conservation

Kent P. McFarland[1] , Leif L. Richardson[1,2], Sara Zahendra[1], and Spencer Hardy[1]
[1]Vermont Center for Ecostudies, Norwich, VT, [2]Gund Institute for Environment, University of Vermont, Burlington, VT
Corresponding authors: kmcfarland@vtecostudies.org @KPMcFarland | leif.richardson@uvm.edu @leifr7

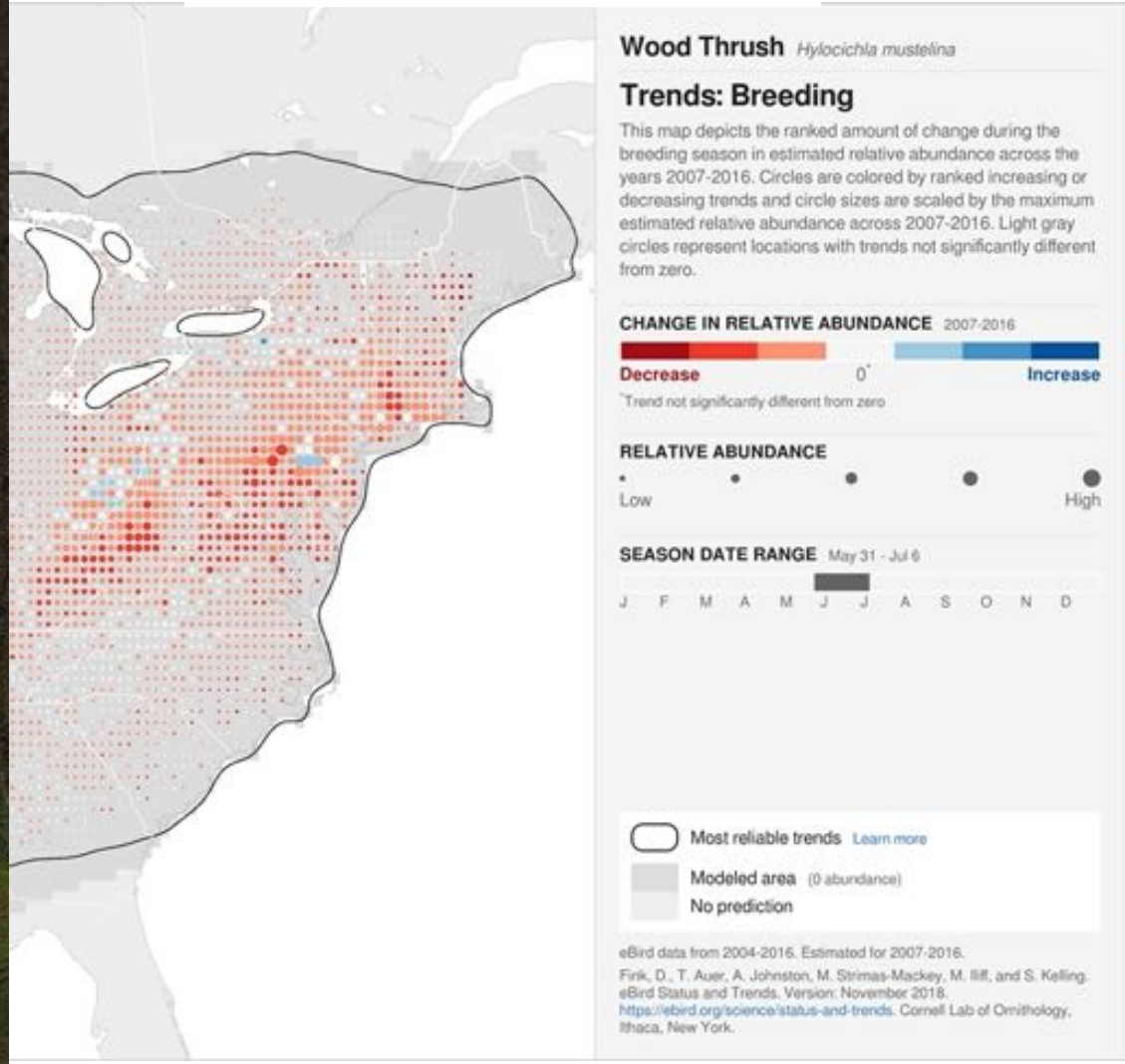






Decline of the North American avifauna. (2019) *Science*, *366*(6461), 120-124. https://par.nsf.gov/servlets/purl/10133018

Vermont eBird

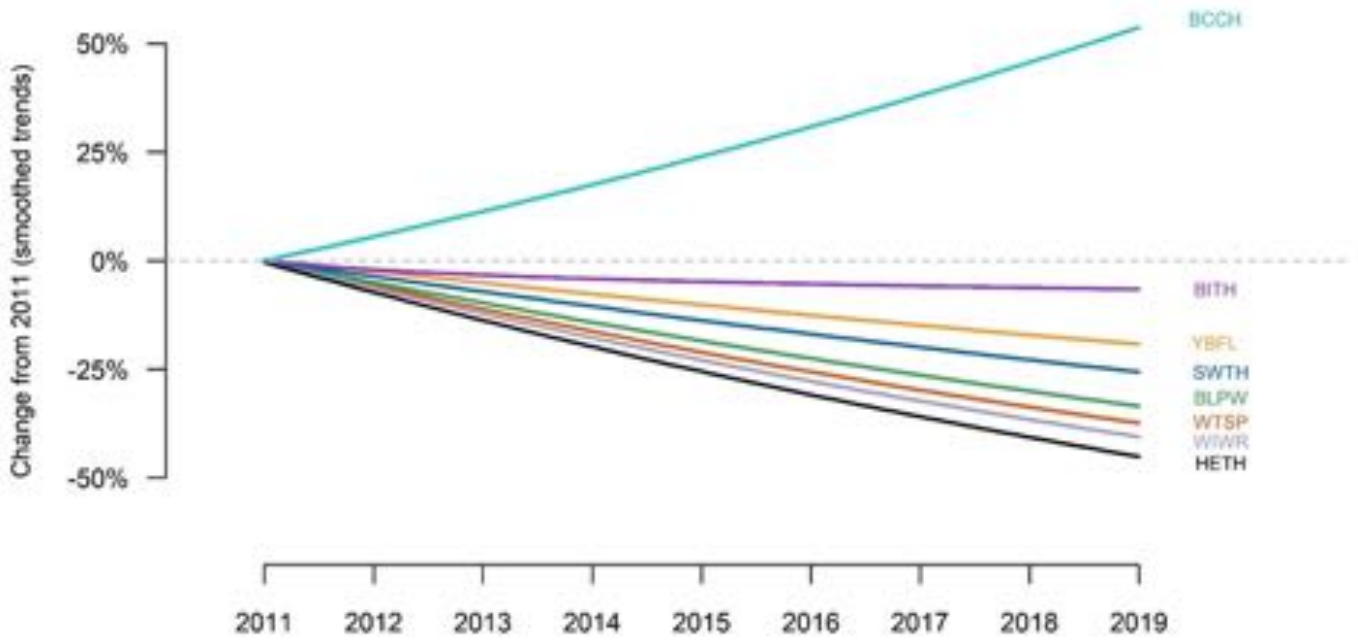


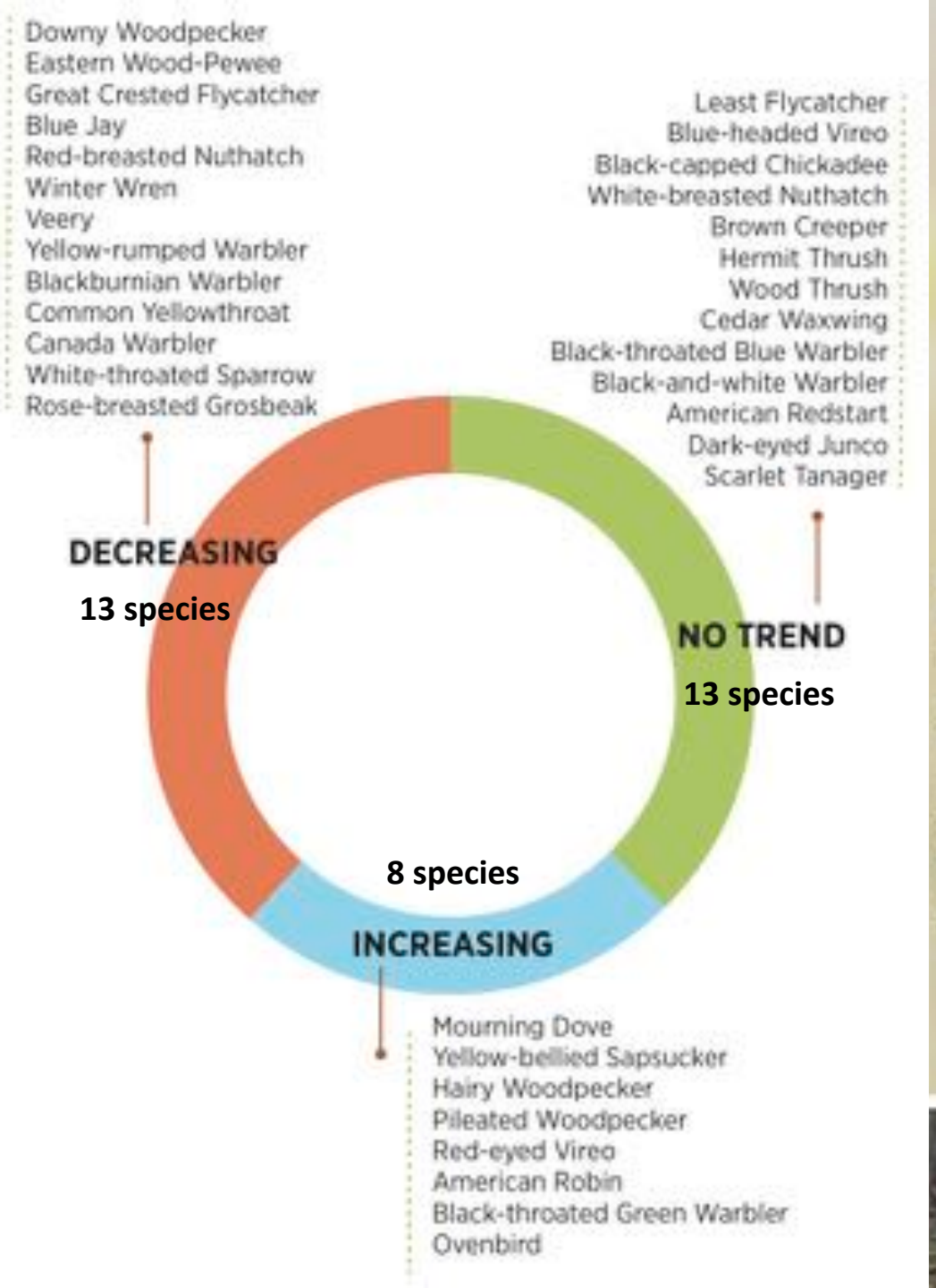
THE STATE OF THE MOUNTAIN BIRDS

Measuring the Population Health of Our Northeastern U.S. Montane Bird Species

PI: Jason Hill https://mountainbirds.vtecostudies.org/

READ THE SUMMARY OF THE STATE OF THE MOUNTAIN BIRDS REPORT: 2020

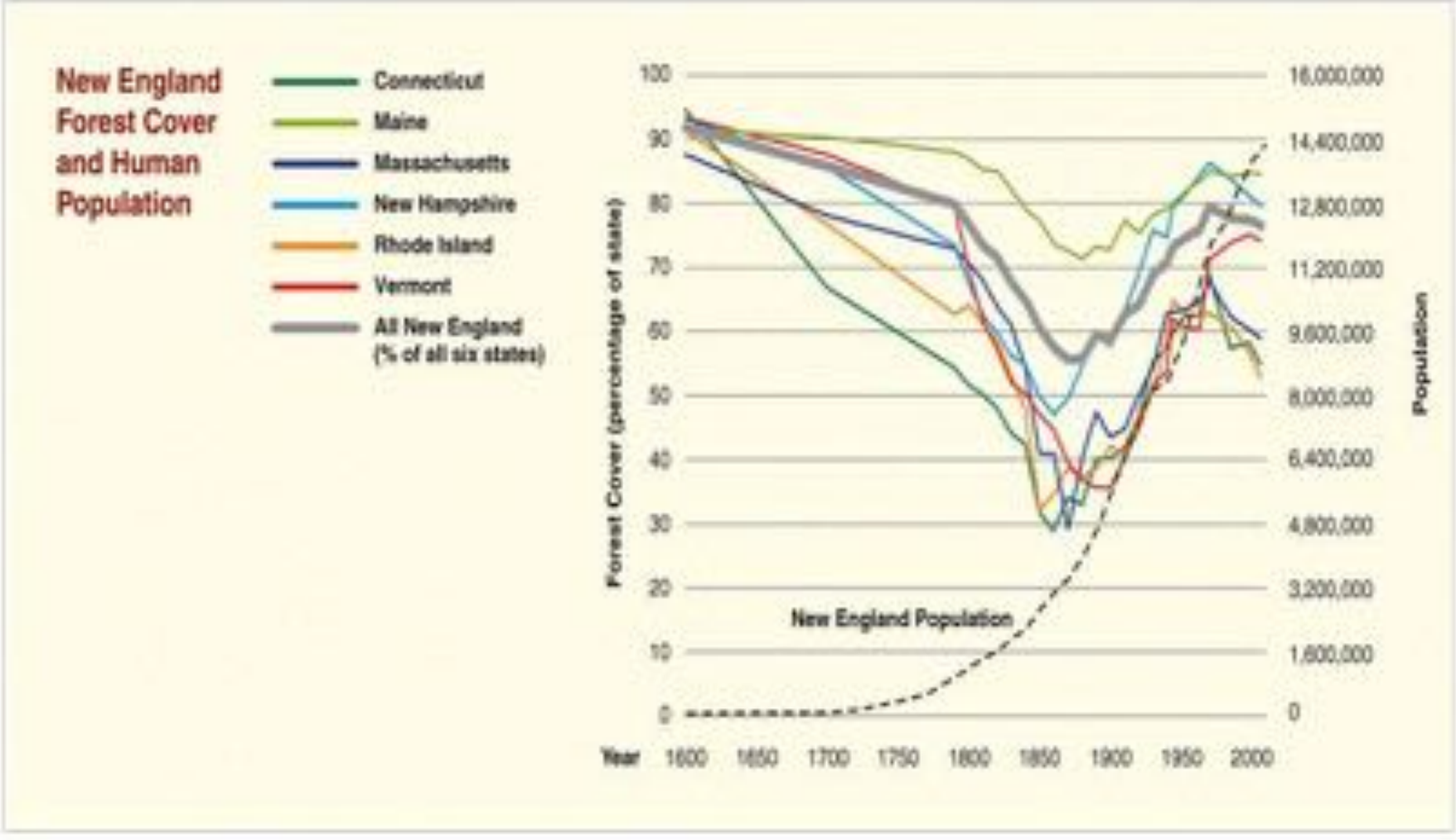



Downy Woodpecker
Eastern Wood-Pewee
Great Crested Flycatcher
Blue Jay
Red-breasted Nuthatch
Winter Wren
Veery
Yellow-rumped Warbler
Blackburnian Warbler
Common Yellowthroat
Canada Warbler
White-throated Sparrow
Rose-breasted Grosbeak
DECREASING
13 species
Least Flycatcher
Blue-headed Vireo
Black-capped Chickadee
White-breasted Nuthatch
Brown Creeper
Hermit Thrush
Wood Thrush
Cedar Waxwing
Black-throated Blue Warbler
Black-and-white Warbler
American Redstart
Dark-eyed Junco
Scarlet Tanager
NO TREND
13 species
8 species
INCREASING
Mourning Dove
Yellow-bellied Sapsucker
Hairy Woodpecker
Pileated Woodpecker
Red-eyed Vireo
American Robin
Black-throated Green Warbler
Ovenbird

2017
THE STATUS OF VERMONT FOREST BIRDS:
A Quarter Century of Monitoring
1989 – 2013

New England Forests Declining Again

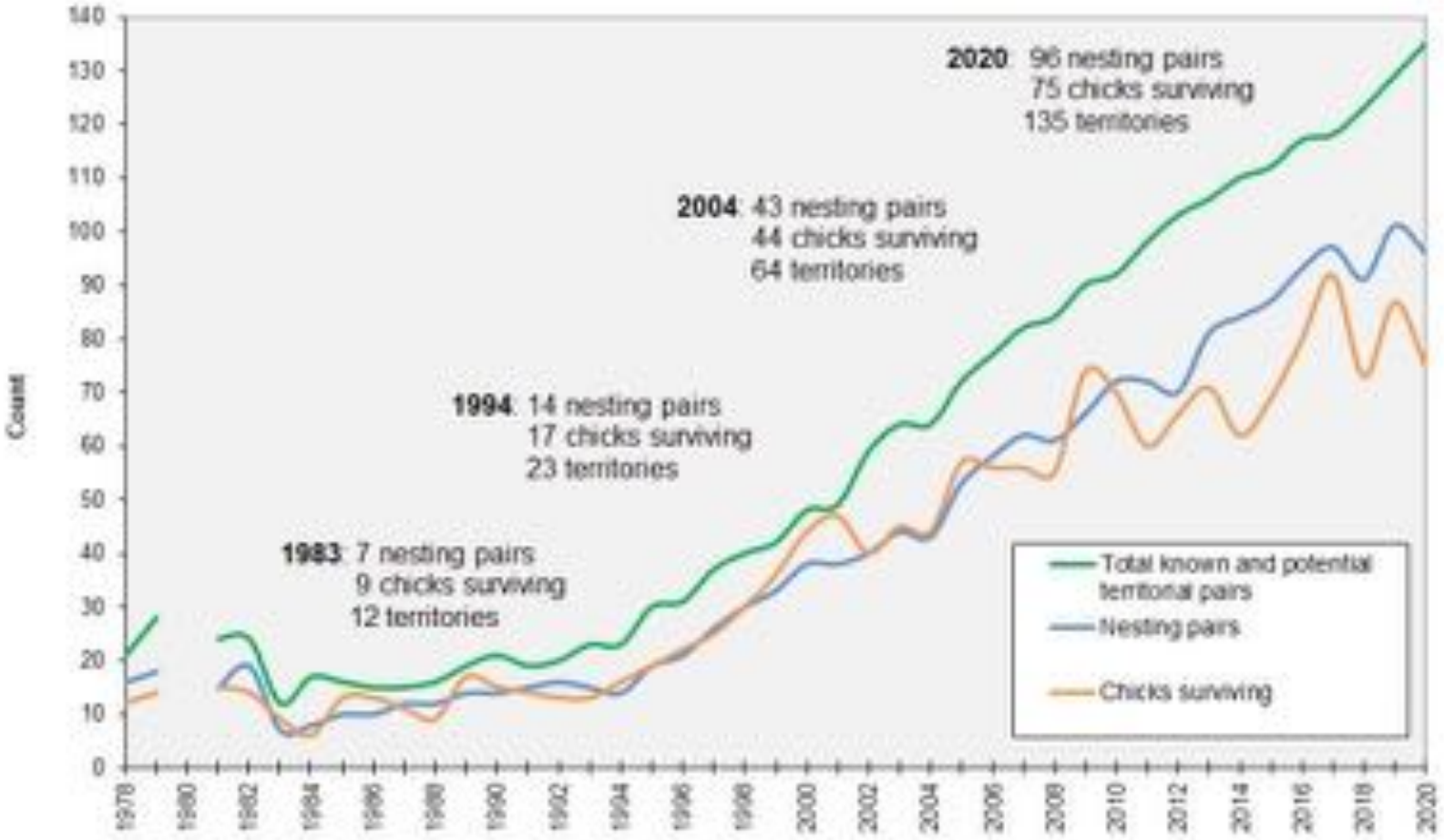
New England Historical Forest Cover



Vermont Loon Conservation Project

Monitoring – Management – Public Outreach

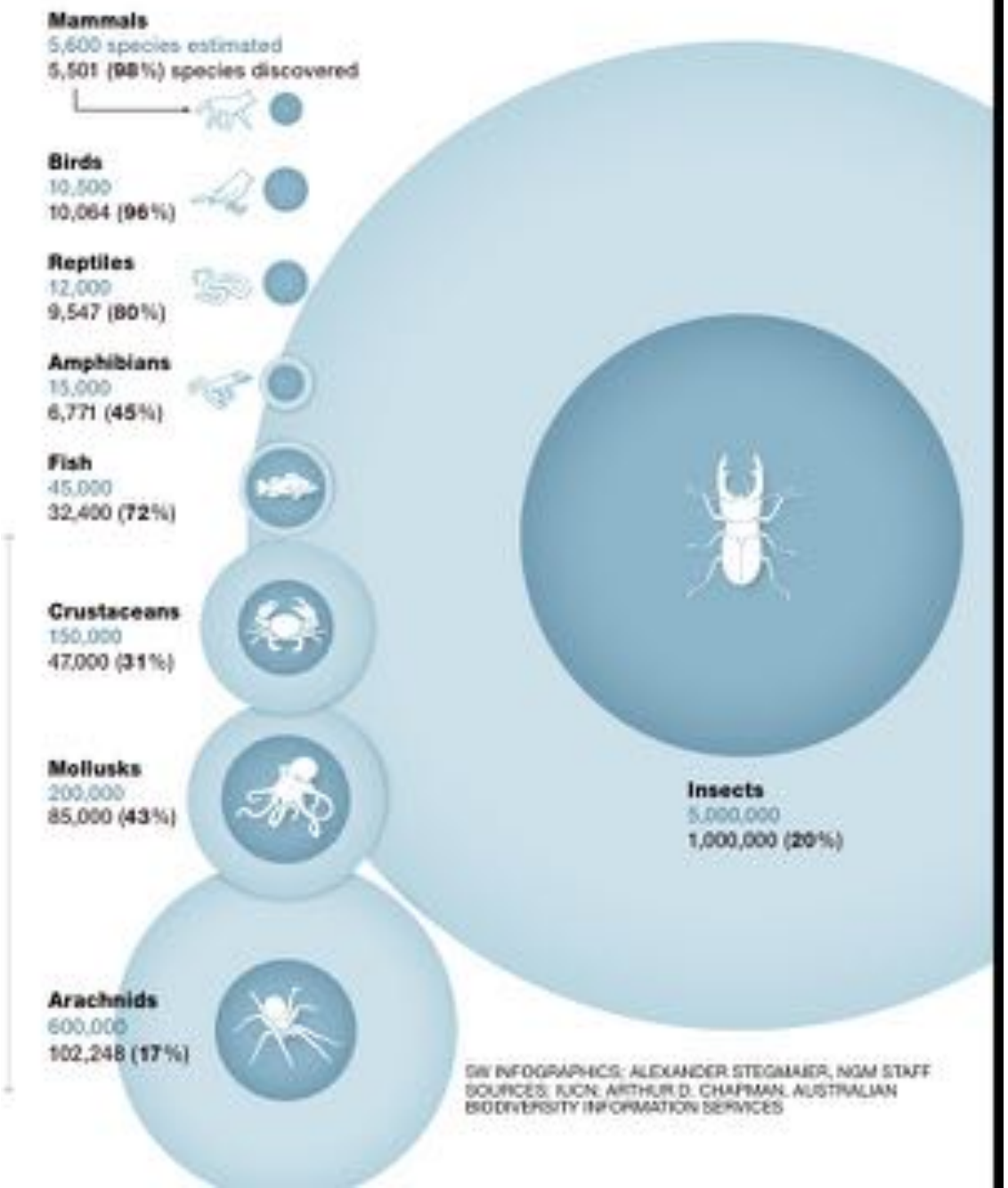
PI: Eric Hanson



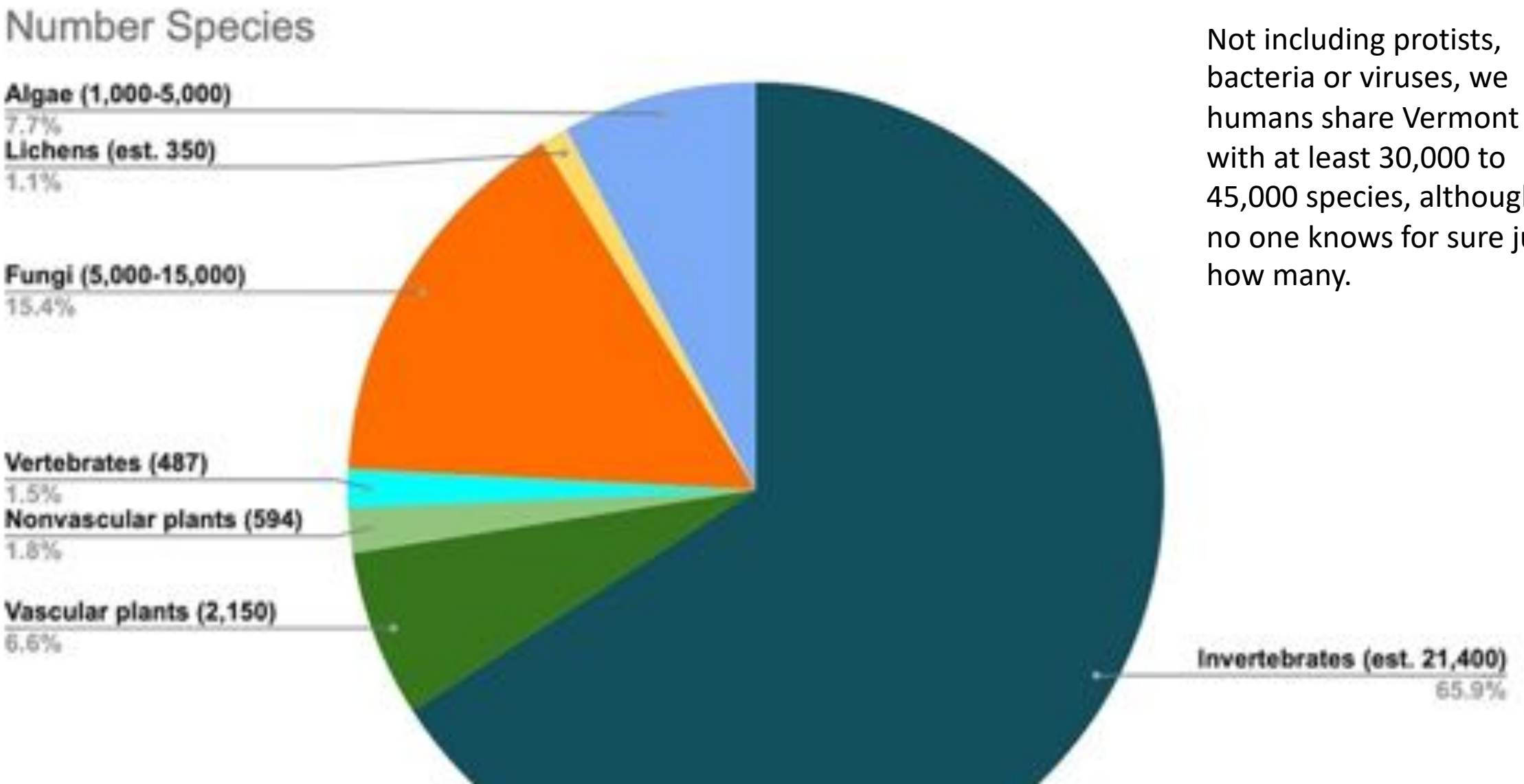
Listed as state endangered in 1987

Delisted 2005

World Biodiversity



Vermont Species



Not including protists, bacteria or viruses, we humans share Vermont with at least 30,000 to 45,000 species, although no one knows for sure just how many.

Great Smoky Mountains National Park

All-Taxa Biodiversity Inventory (ATBI)

Started on Earth Day 1998

	HISTORIC RECORDS	NEW TO PARK	NEW TO SCIENCE	TOTAL DISCOVERED
TOTALS:	9,479	7,636	923	18,038

Vermont Wild Bee Survey
2019-2022

- We have documented 343 bee species in the state and we believe we may have as many as 375 species here.
- 80 new species discovered for Vermont.
- 16 introduced non-native bees discovered. Some could be competing with native species.

Sunflower Burrowing-Resin Bee (*Paranthidium jugatorium*) first discovered in Vermont by Kevin Hemeon.

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VERMONT FISH & WILDLIFE

GUND INSTITUTE FOR ENVIRONMENT

CBD

Convention on Biological Diversity

THE POST 2020

GLOBAL BIODIVERSITY FRAMEWORK

2030 Action Target 3:

Conserve at least 30% of land & sea areas through measures that are

- ✓ effective & equitable
- ✓ ecologically representative
- ✓ well-connected
- ✓ integrated into wider landscapes & seascapes

2030 ACTION TARGET 3

PROTECT AND CONSERVE LAND AND SEA

#POST2020 #FORNATURE #COP15

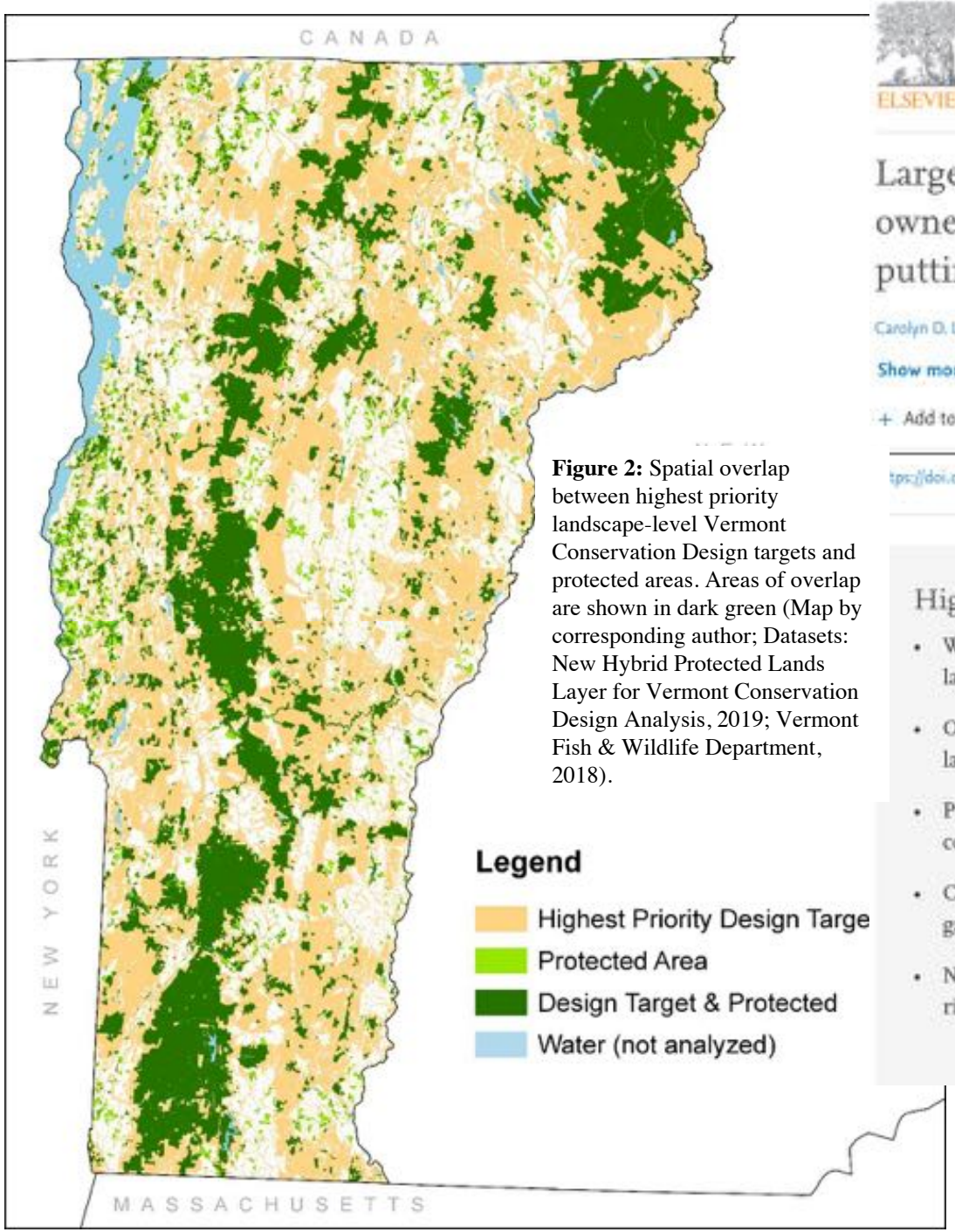

Figure 2: Spatial overlap between highest priority landscape-level Vermont Conservation Design targets and protected areas. Areas of overlap are shown in dark green (Map by corresponding author; Datasets: New Hybrid Protected Lands Layer for Vermont Conservation Design Analysis, 2019; Vermont Fish & Wildlife Department, 2018).

ELSEVIER

Biological Conservation
Volume 243, March 2020, 108462

Large landscape conservation in a mixed ownership region: Opportunities and barriers for putting the pieces together

Carolyn D. Loeb [a], Anthony W. D'Amato [b]

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https://doi.org/10.1016/j.biocon.2020.108462

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Highlights

- We compared protected lands in Vermont, USA with a new large landscape design.
- One third of highest priority design targets have been met via protected lands.
- Public agencies stand out as top interest holders in targeted forest and connectivity blocks.
- Corporate timberland sales have been special opportunities for design gains.
- Nonprofits play an important role as top interest holders in protected riparian targets.

Vermont Conservation Design

Maintaining and Enhancing an Ecologically Functional Landscape

Summary Report for
Landscapes, Natural Communities, Habitats, and Species

February 2018

Eric Sorenson and Robert Zaino

Core Participants:
Jens Hilke, Doug Morin – Vermont Fish and Wildlife Department
Keith Thompson – Vermont Department of Forests, Parks and Recreation
Elizabeth Thompson – Vermont Land Trust

VERMONT
AGENCY OF NATURAL RESOURCES
Respect. Protect. Enjoy.

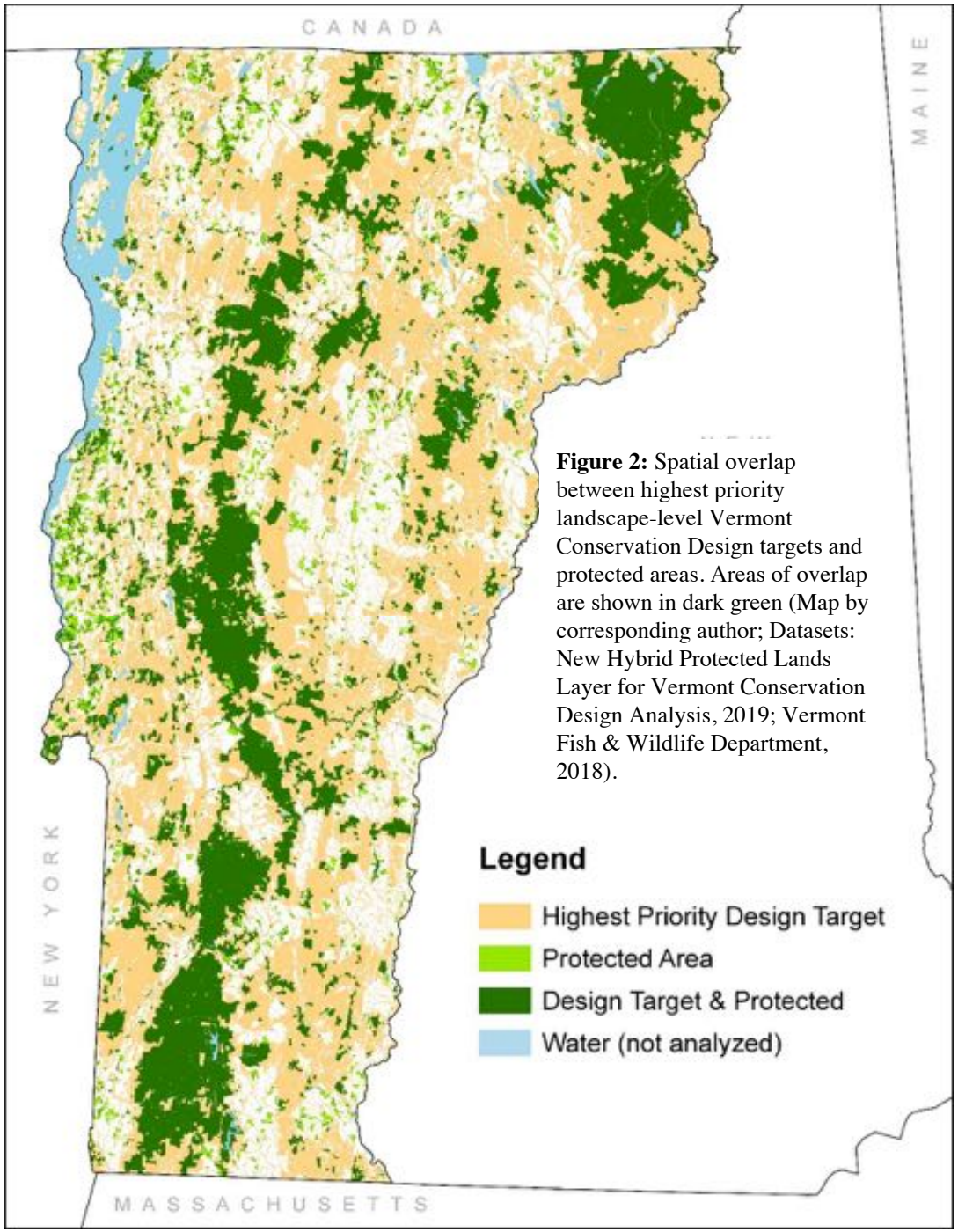
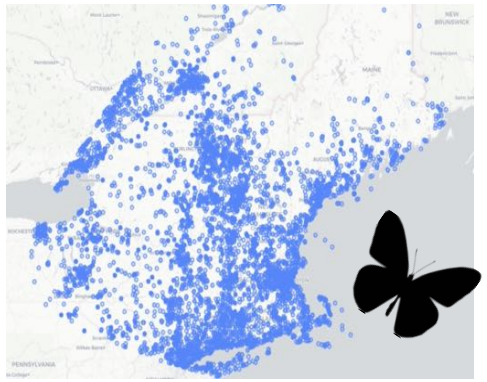


Figure 2: Spatial overlap between highest priority landscape-level Vermont Conservation Design targets and protected areas. Areas of overlap are shown in dark green (Map by corresponding author; Datasets: New Hybrid Protected Lands Layer for Vermont Conservation Design Analysis, 2019; Vermont Fish & Wildlife Department, 2018).

From Loeb and D'Amato (2020):

- ~68% of Vermont land area falls within some type of high priority area for the VCD.
- ~26% of Vermont is already formally protected.
- ~22% is within VCD highest priority areas. So we are well on our way to 30% total area by 2030 on VCD highest priority areas with at least some level of protection.
- Low and mid-elevation sites are currently under-represented.

Presence data



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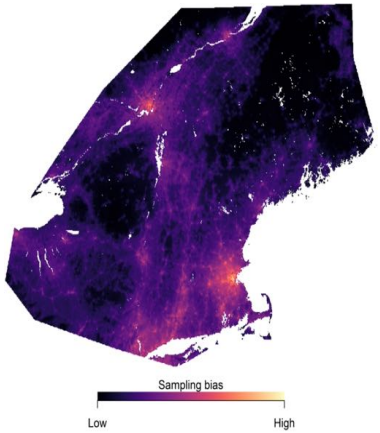
Sampling Bias



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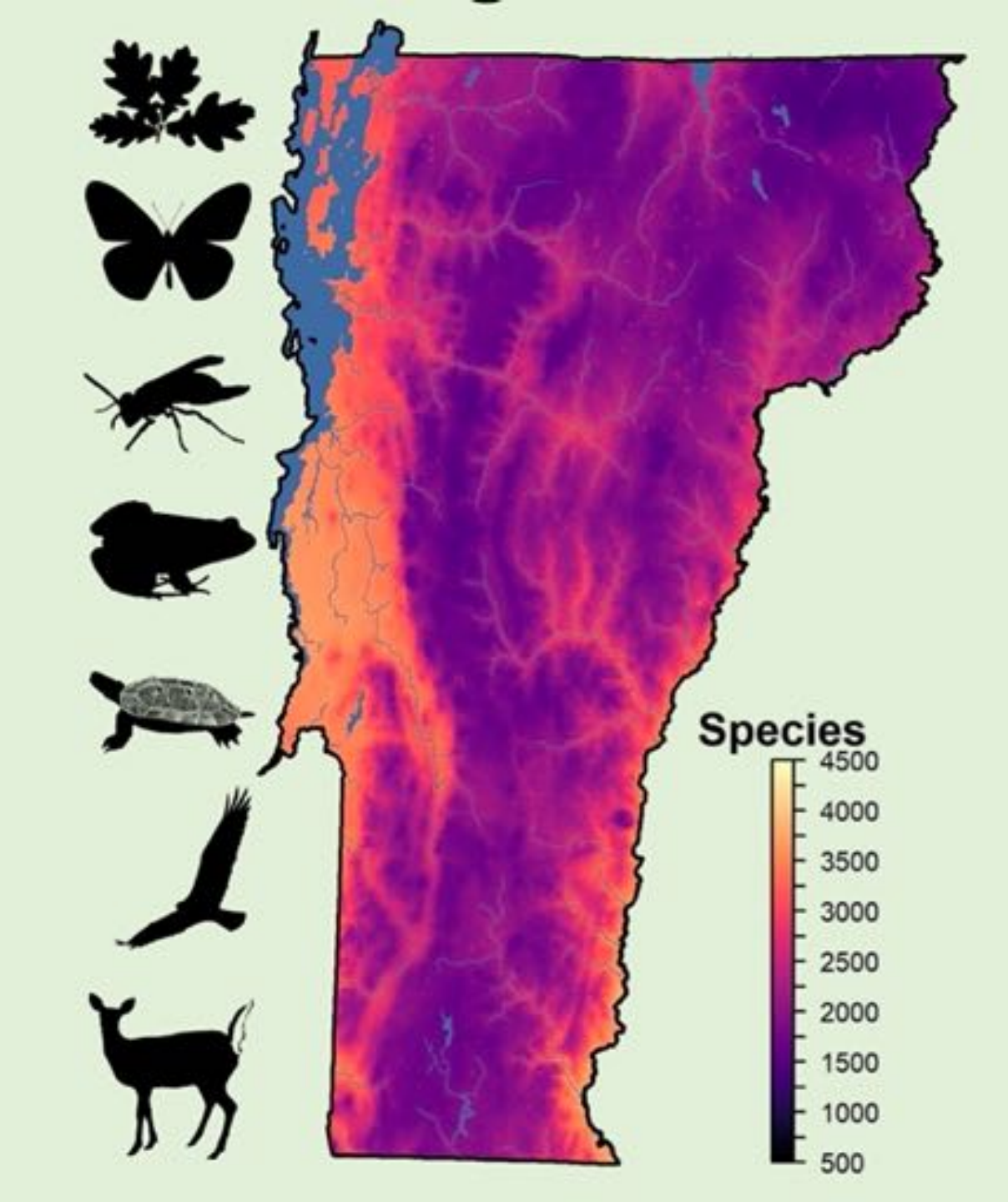
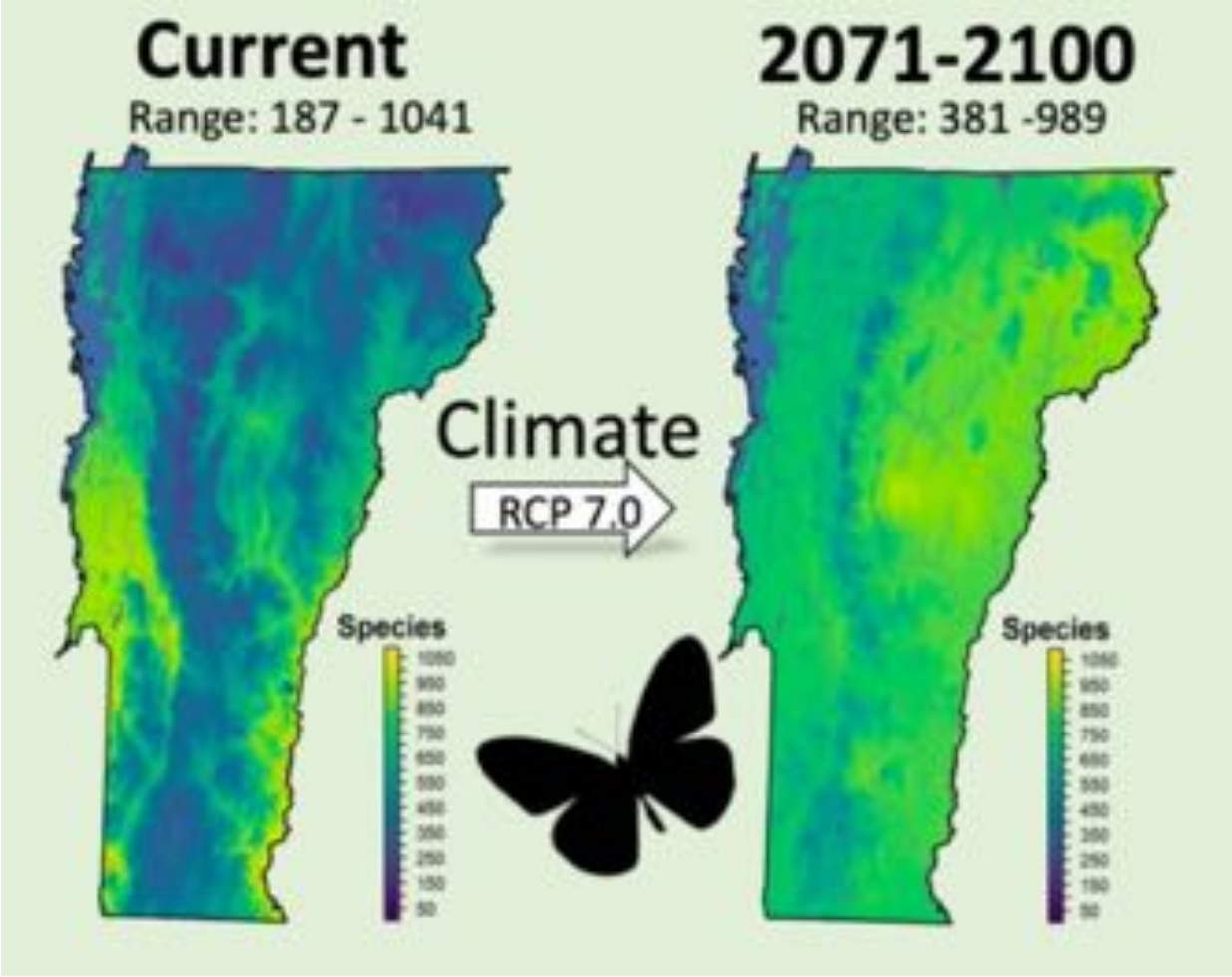
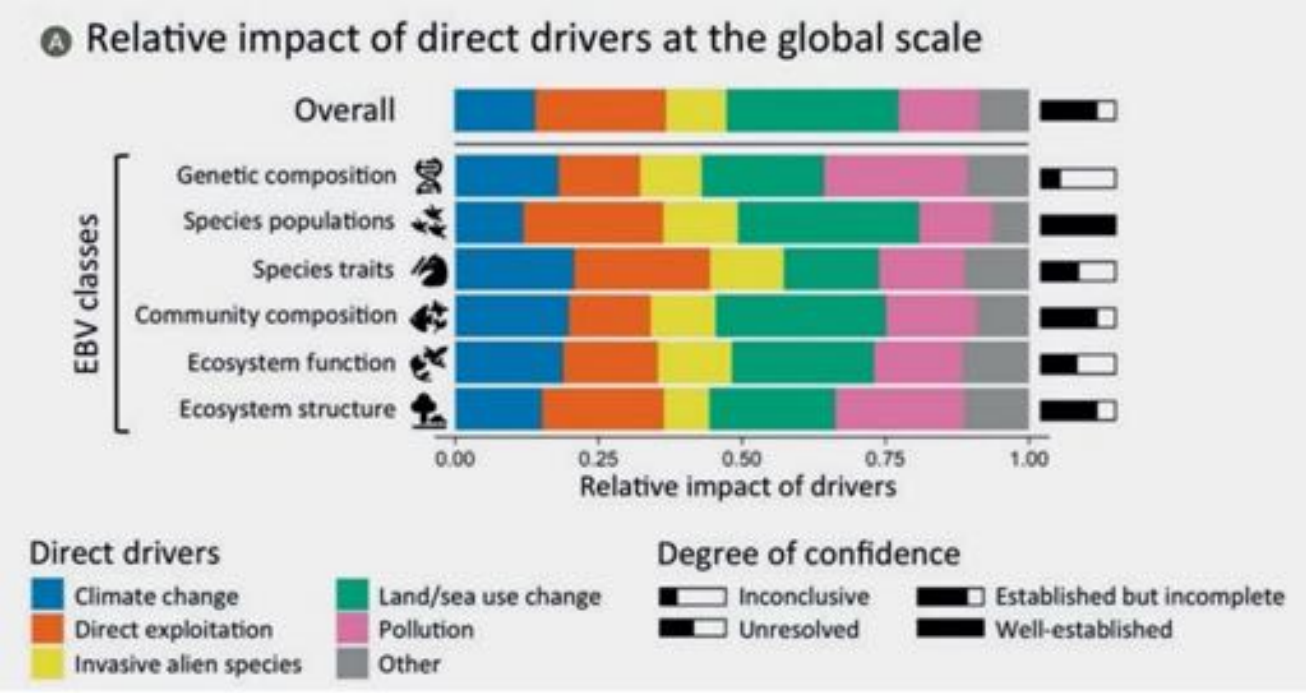
Bioclimatic Data

1km x 1km

Distribution


Species
4500
4000
3500
3000
2500
2000
1500
1000
500


Current
Range: 187 - 1041
2071-2100
Range: 381 -989
Climate
RCP 7.0
Species
Species

Some Considerations

- Halting, then reversing the dangerous, ongoing loss of biological diversity requires more than an expanded system of protected areas.
- With ~68% of Vermont land area within some type of high priority area for the VCD and there is already ~22% of it under some sort of protection status, arriving at 30% by 2030 might be a low bar?
- Currently ~3.6% of protected areas are GAP Status 1, and 1.8% GAP status 2. Most of these are at higher elevations. We need a lot more of these on the entire landscape.
- We need to monitor our natural heritage more thoroughly to understand how our actions are affecting biodiversity.