

Breeding Bird Atlases: Putting the *science* into citizen *science*

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THE UNIVERSITY
of
WISCONSIN
MADISON



Human Population:
7,297,383,140



Widespread
Millions of observations
Variety of ecosystems

Value of Citizen Scientists



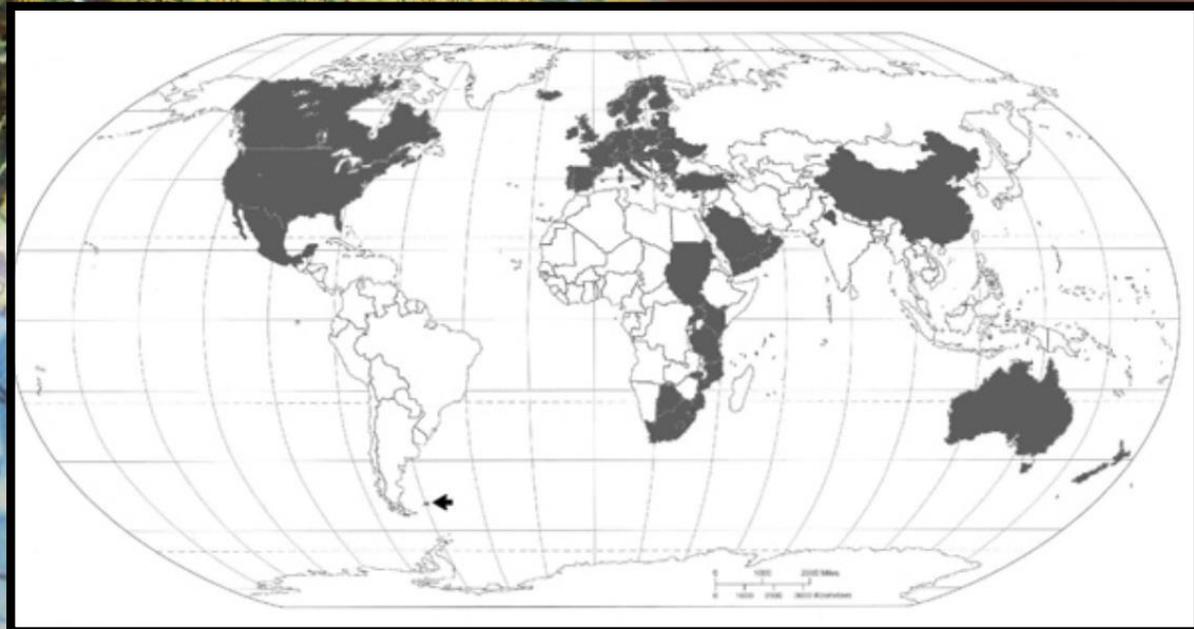
Atlases: A Global Undertaking

411 atlases

50 countries

12 to 10 million km²

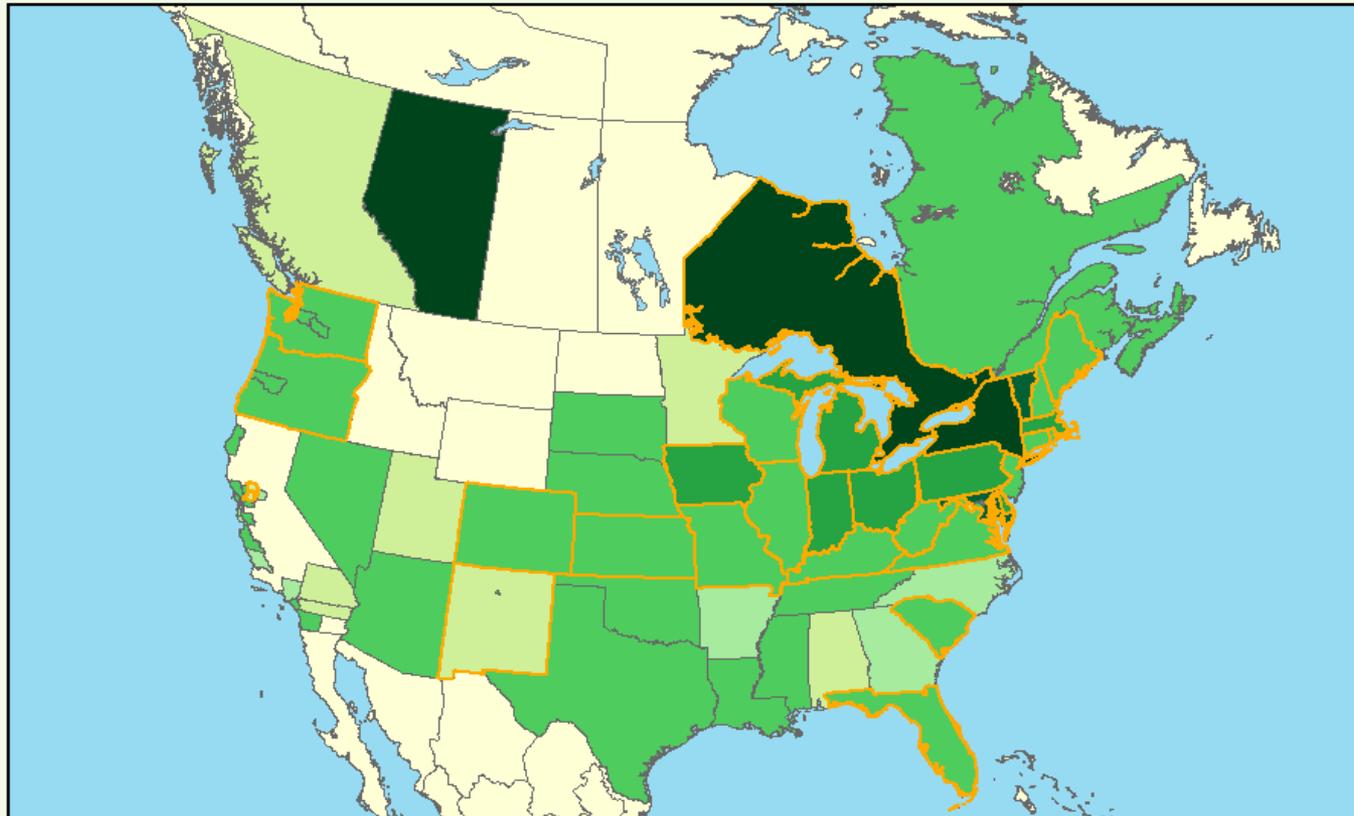
0.06 to 14,400 km²



Atlases: A National Undertaking



Status of North American Breeding Bird Atlases



Atlas status as of January 2009.
States shown with second round atlases have completed a first round atlas.

Source: Individual state and provincial breeding bird atlas datasets as archived at: <http://www.pwrc.usgs.gov/bba>

Prepared by the USGS Patuxent Wildlife Research Center, January 2009

First Round Atlases

- 1st in-progress
- 1st completed
- 1st published

Second Round Atlases

- 2nd in-progress
- 2nd completed
- 2nd published

- Atlases in BBA Explorer
- no atlas

Science of Breeding Bird Atlas



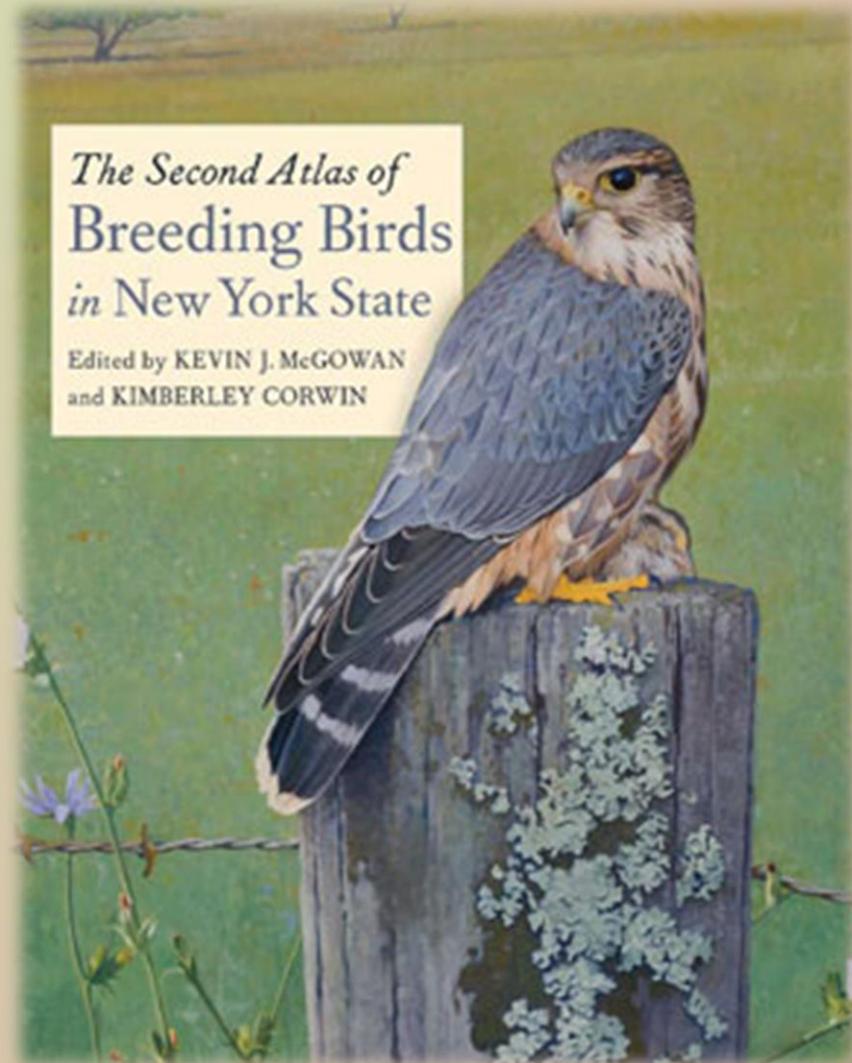
New York State Breeding Bird Atlas

2 time periods

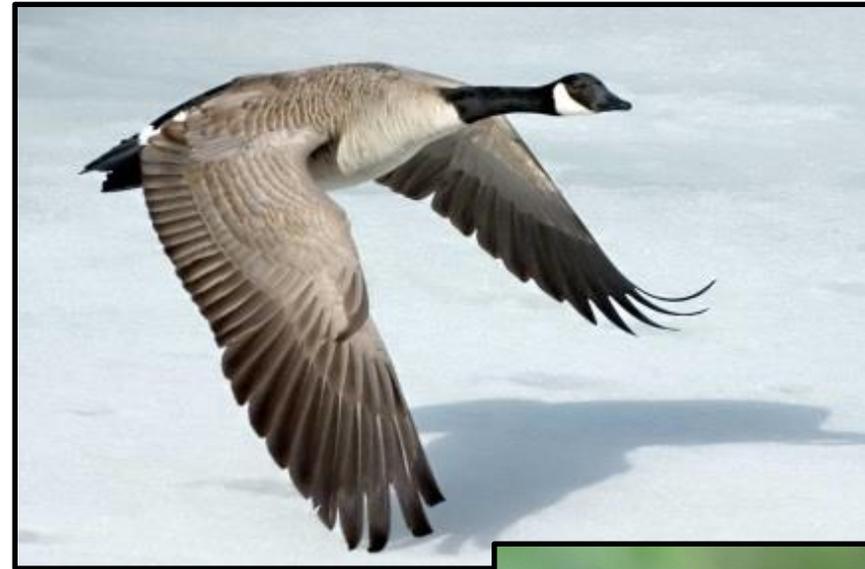
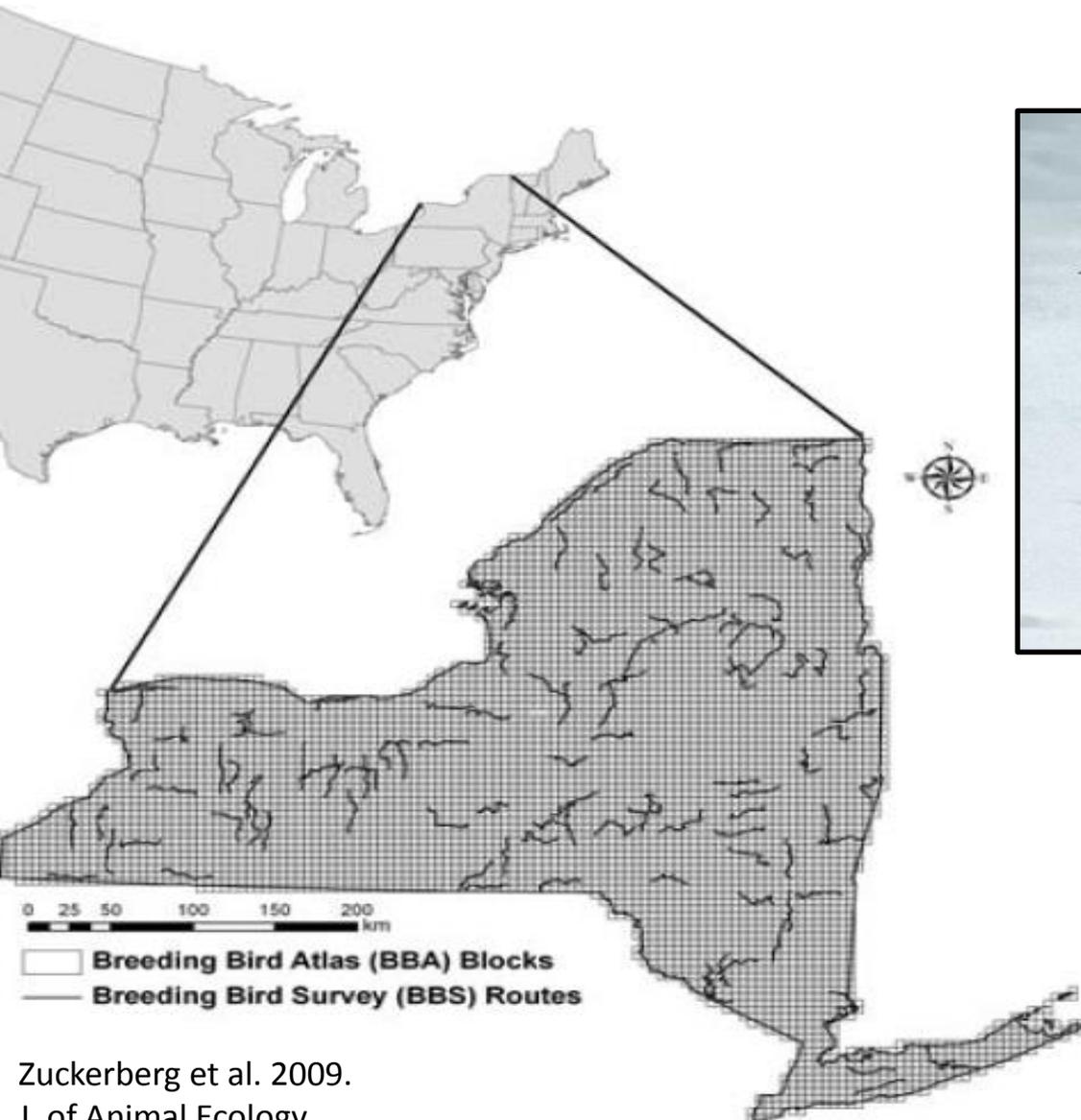
1980-85, 2000-05

5,335 blocks (5 x 5km)

245 species

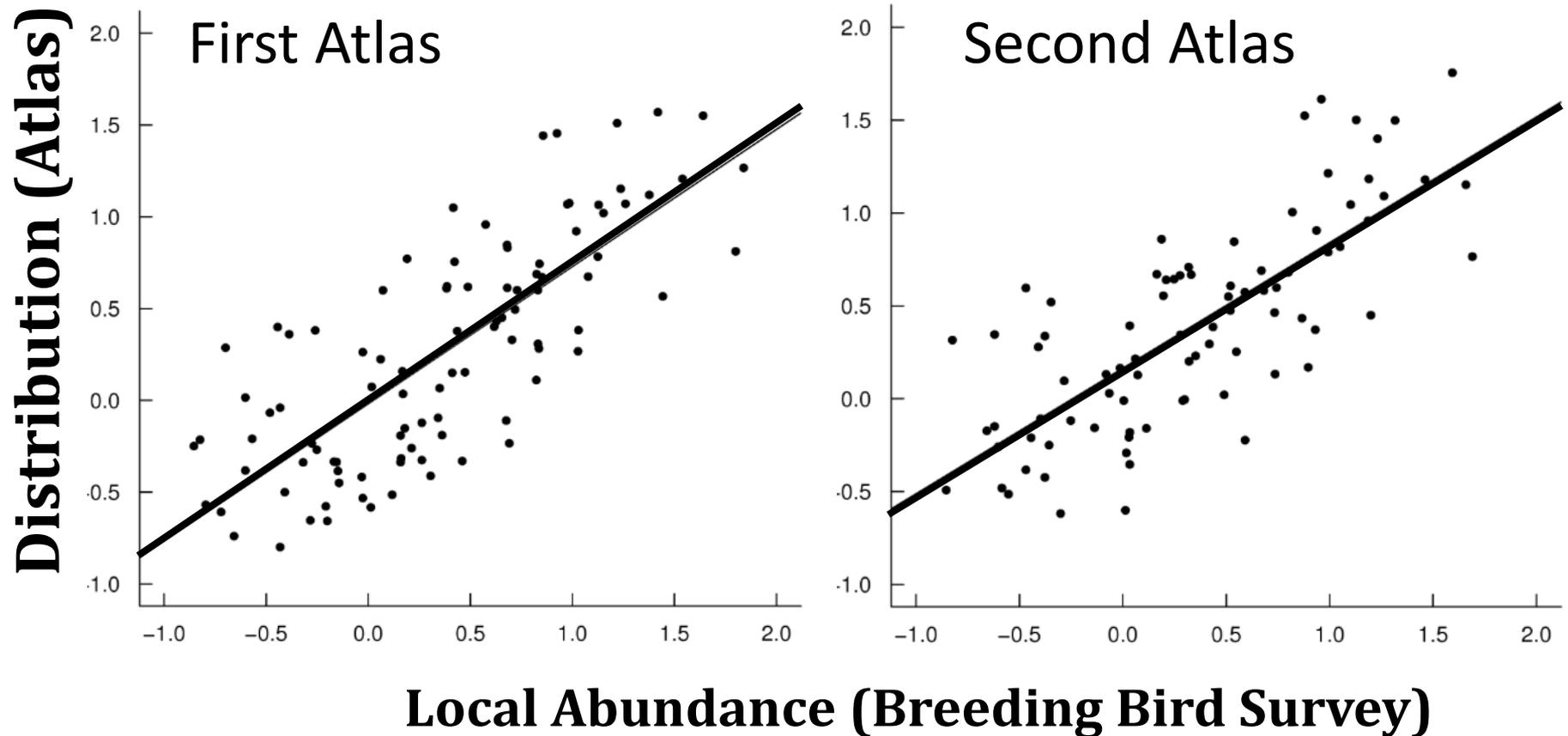


Distribution and Abundance



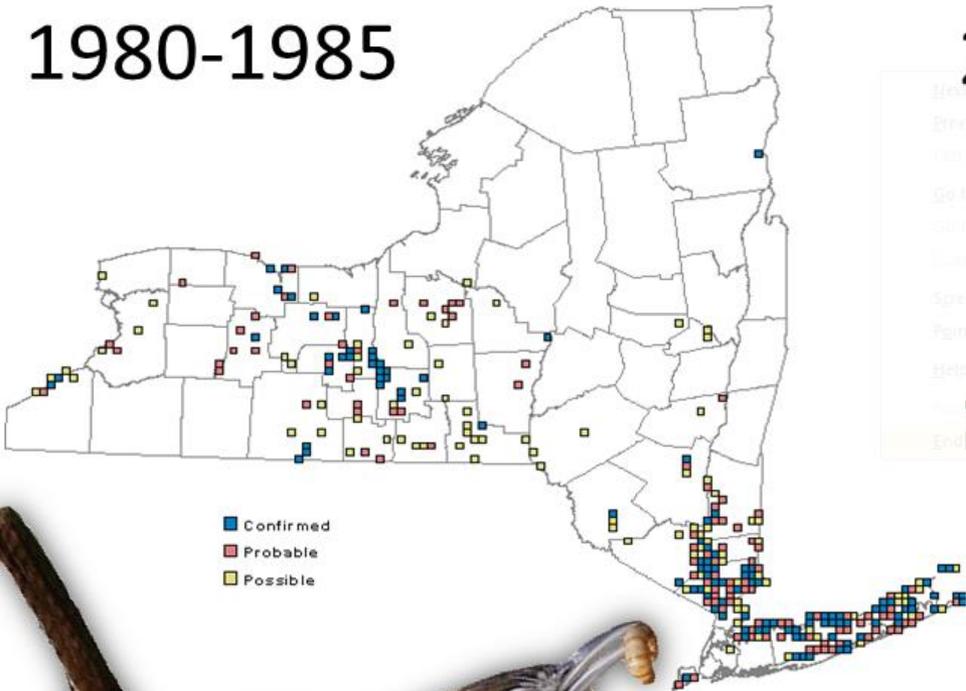
Distribution and Abundance

Birds that are locally more abundant tend to be more widespread

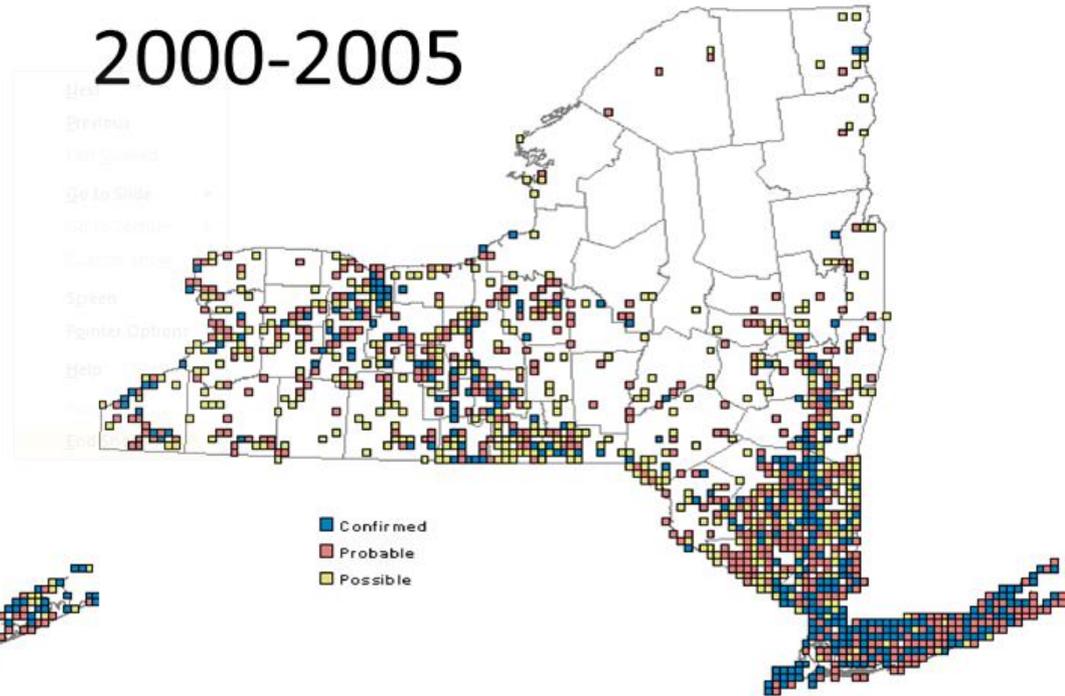


Change is Powerful

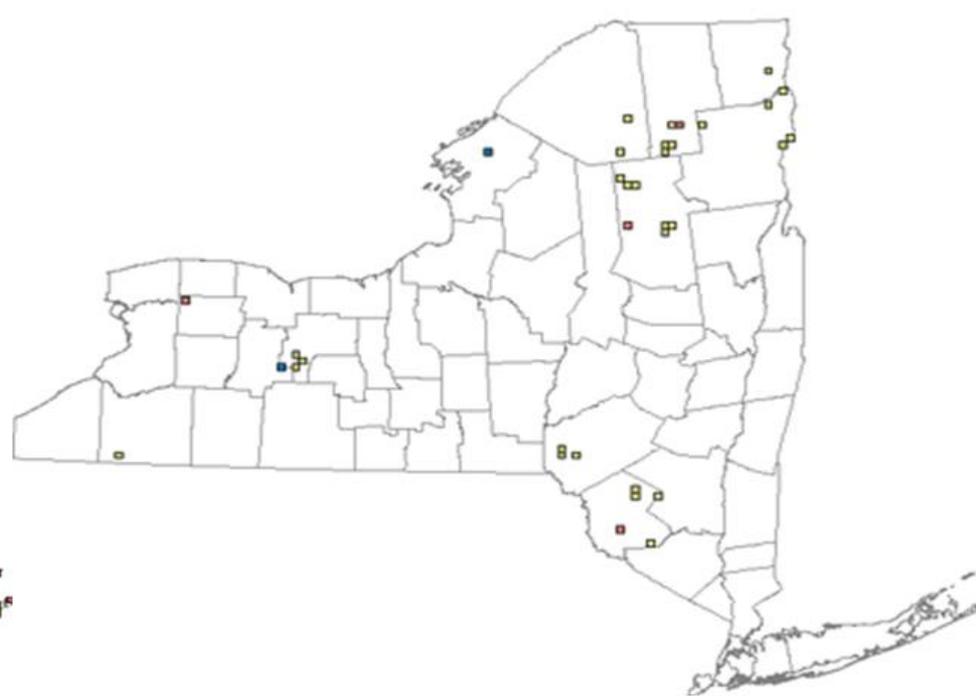
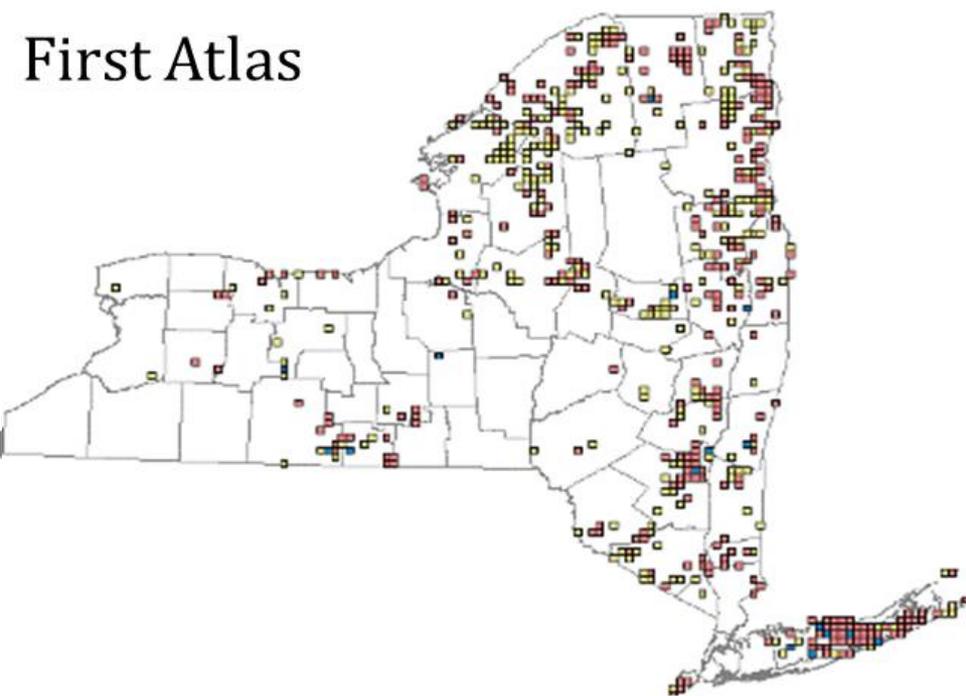
1980-1985



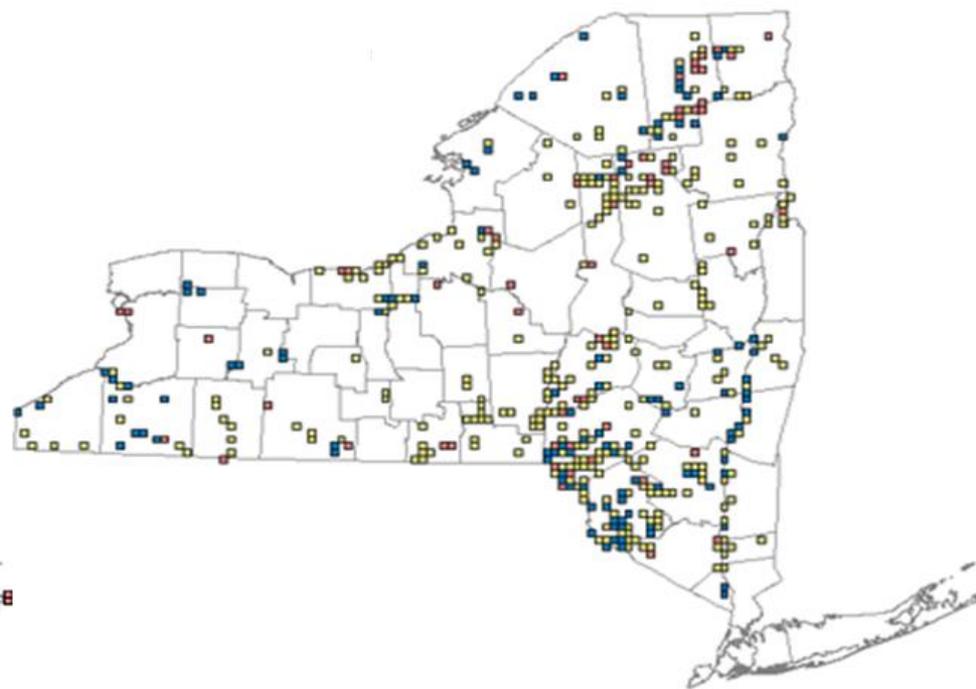
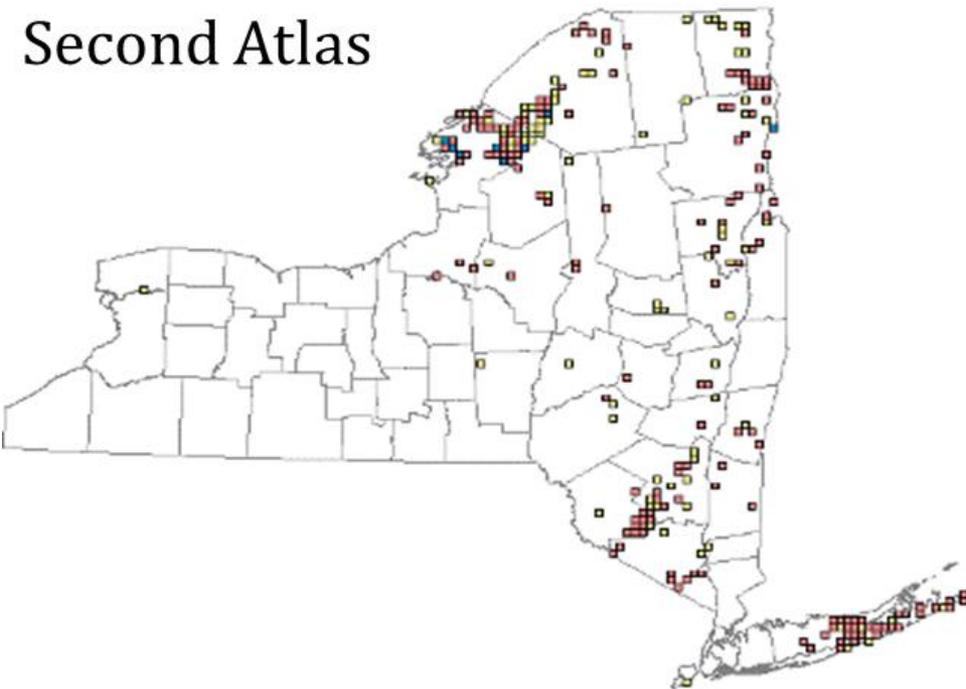
2000-2005



First Atlas

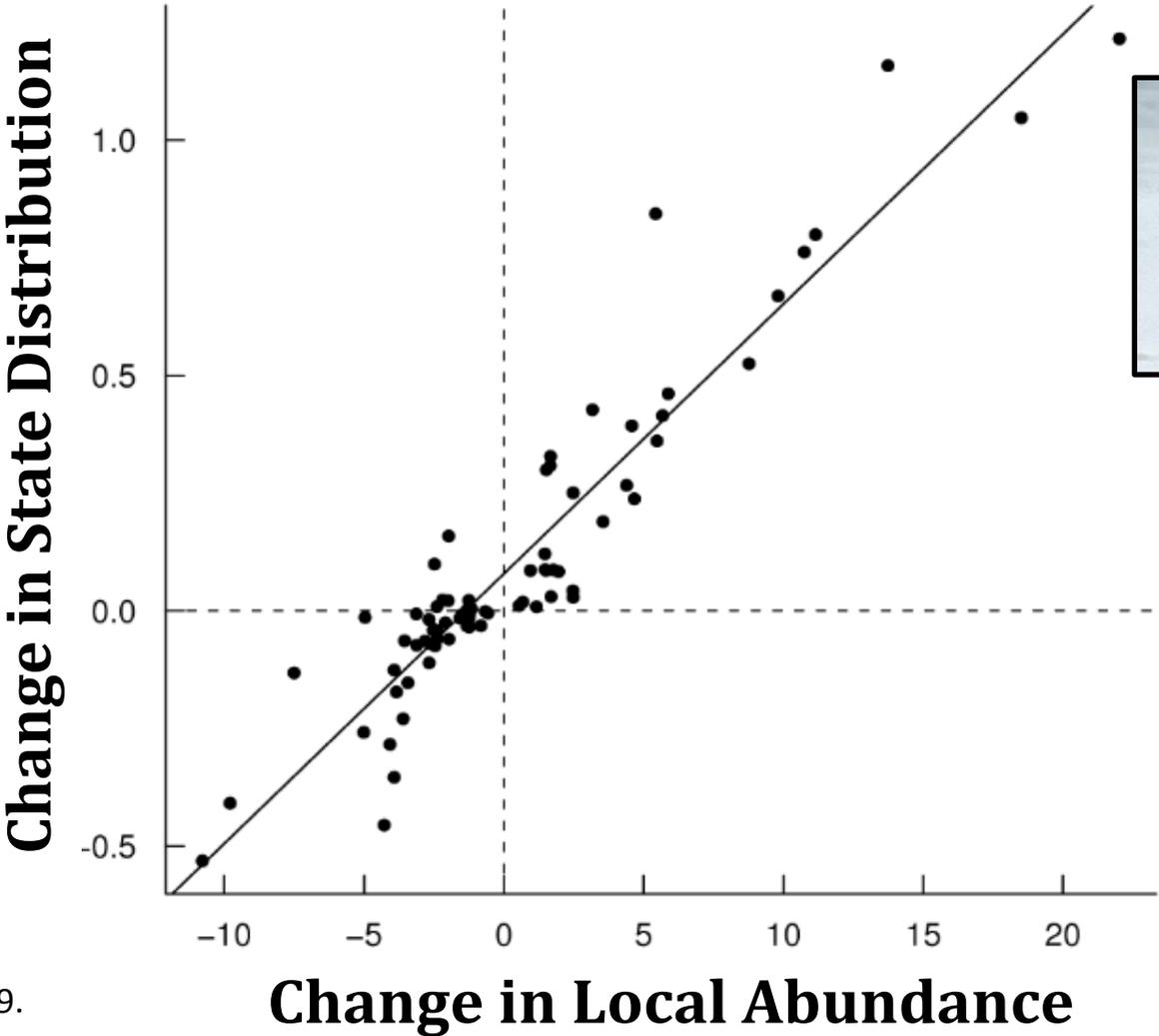


Second Atlas



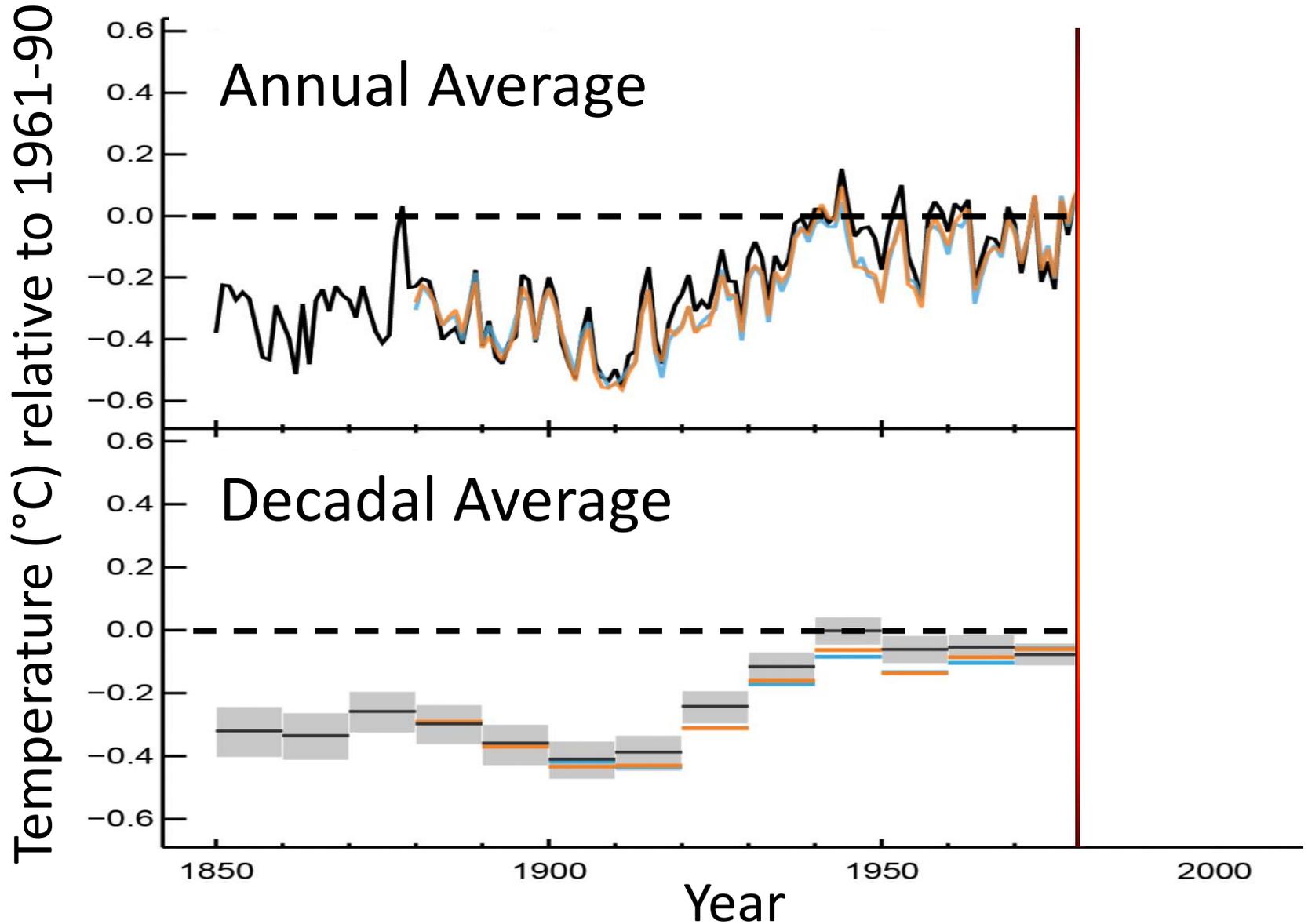


Changing Distributions

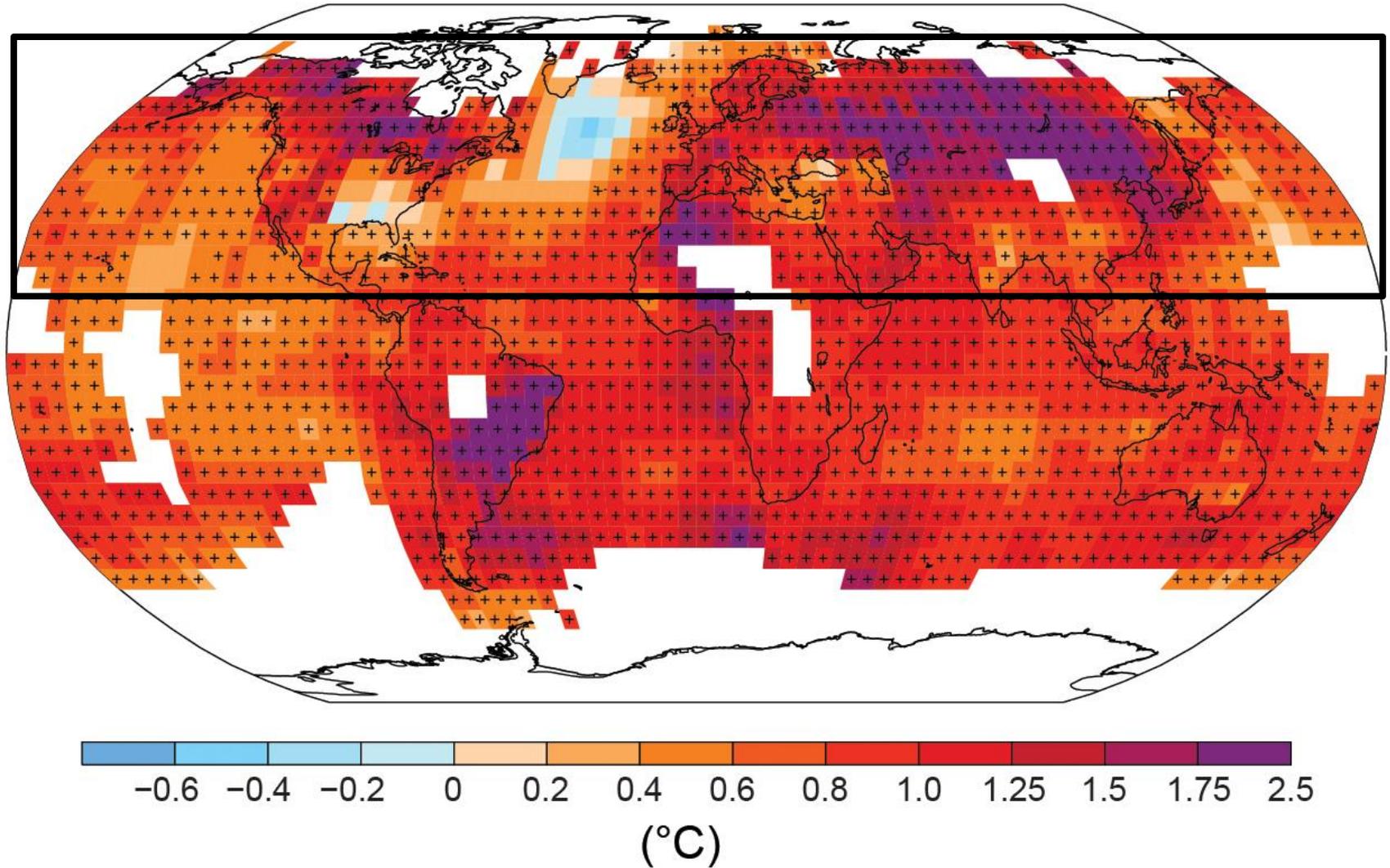


Zuckerberg et al. 2009.
J. of Animal Ecology

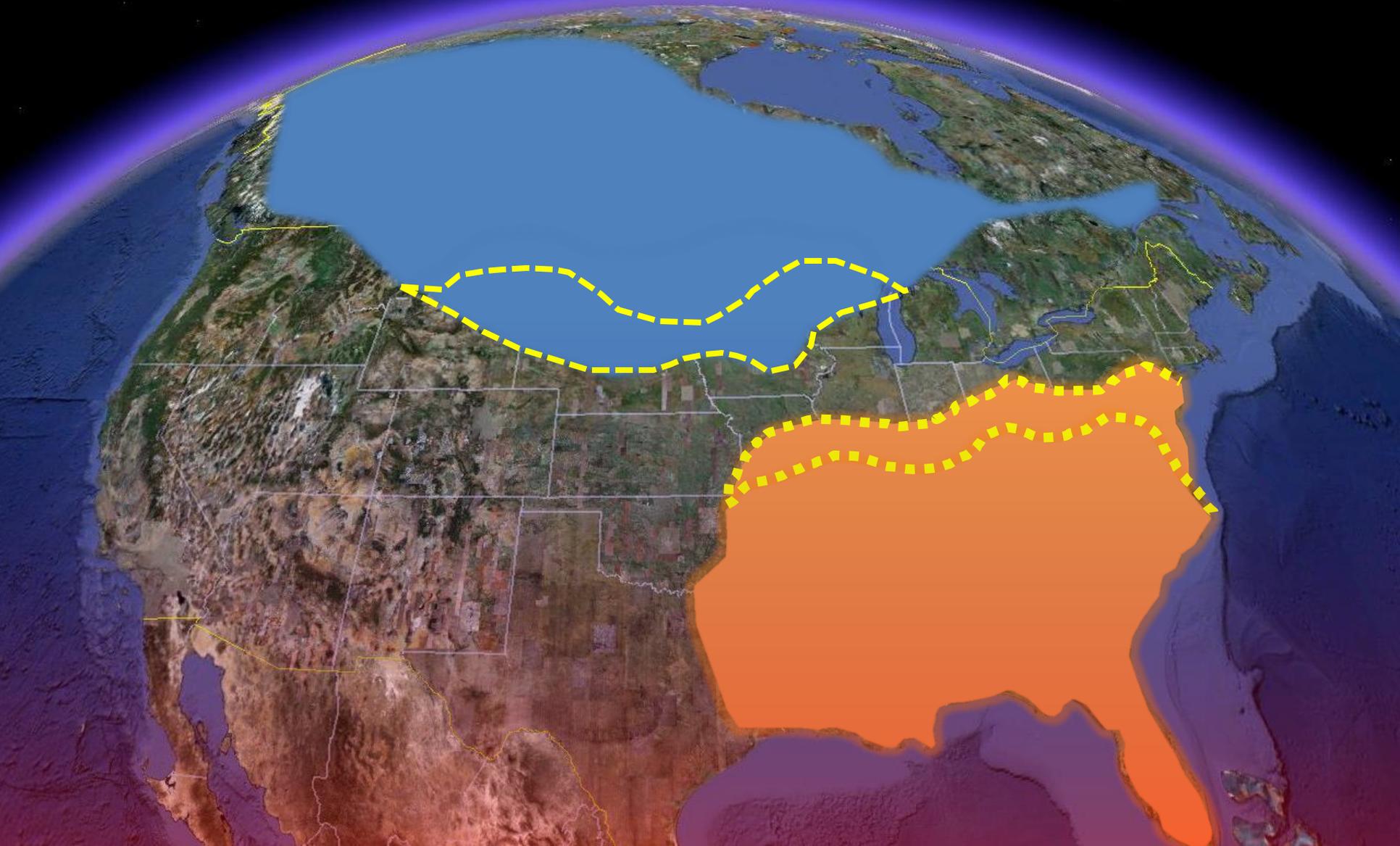
Modern Climate Change



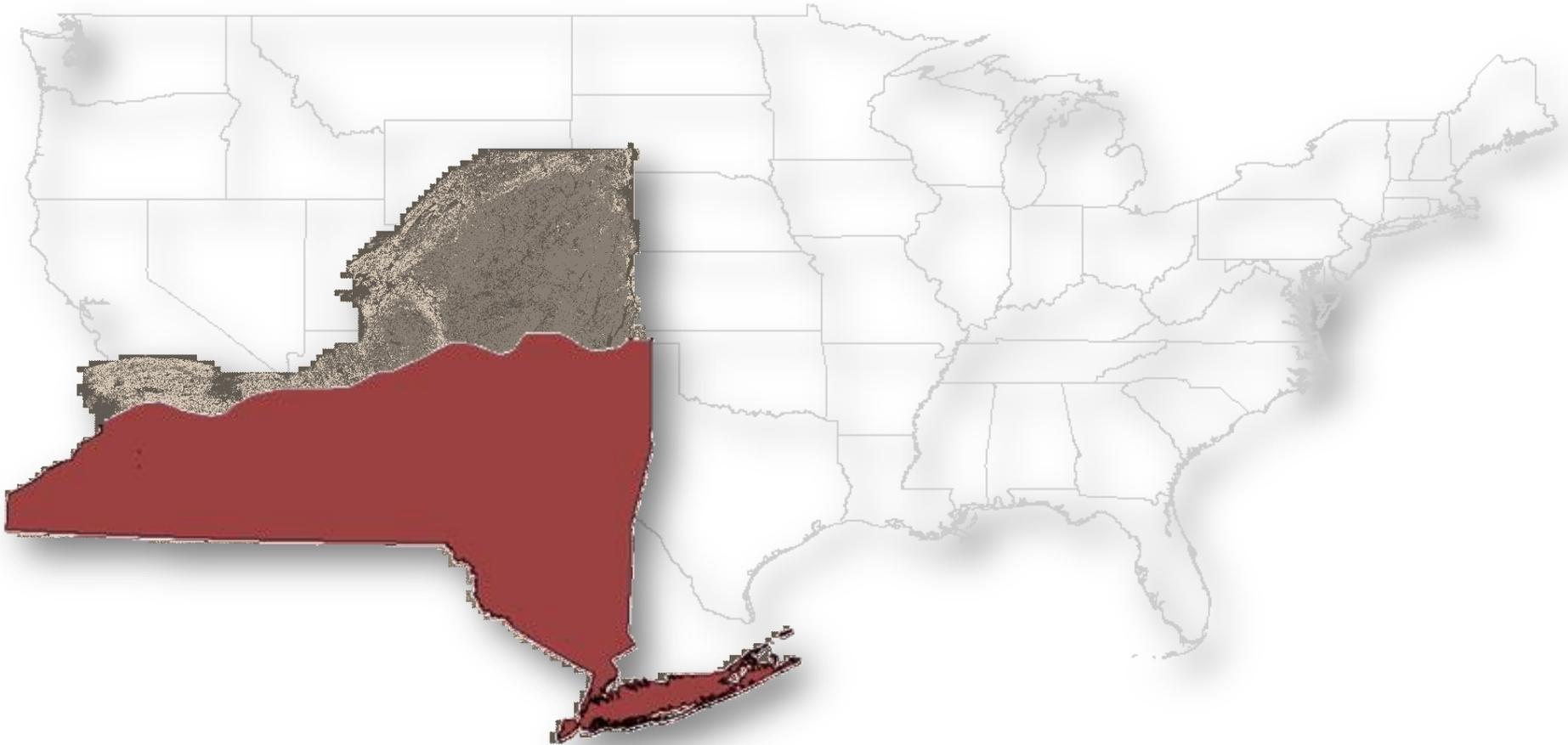
Modern Climate Change



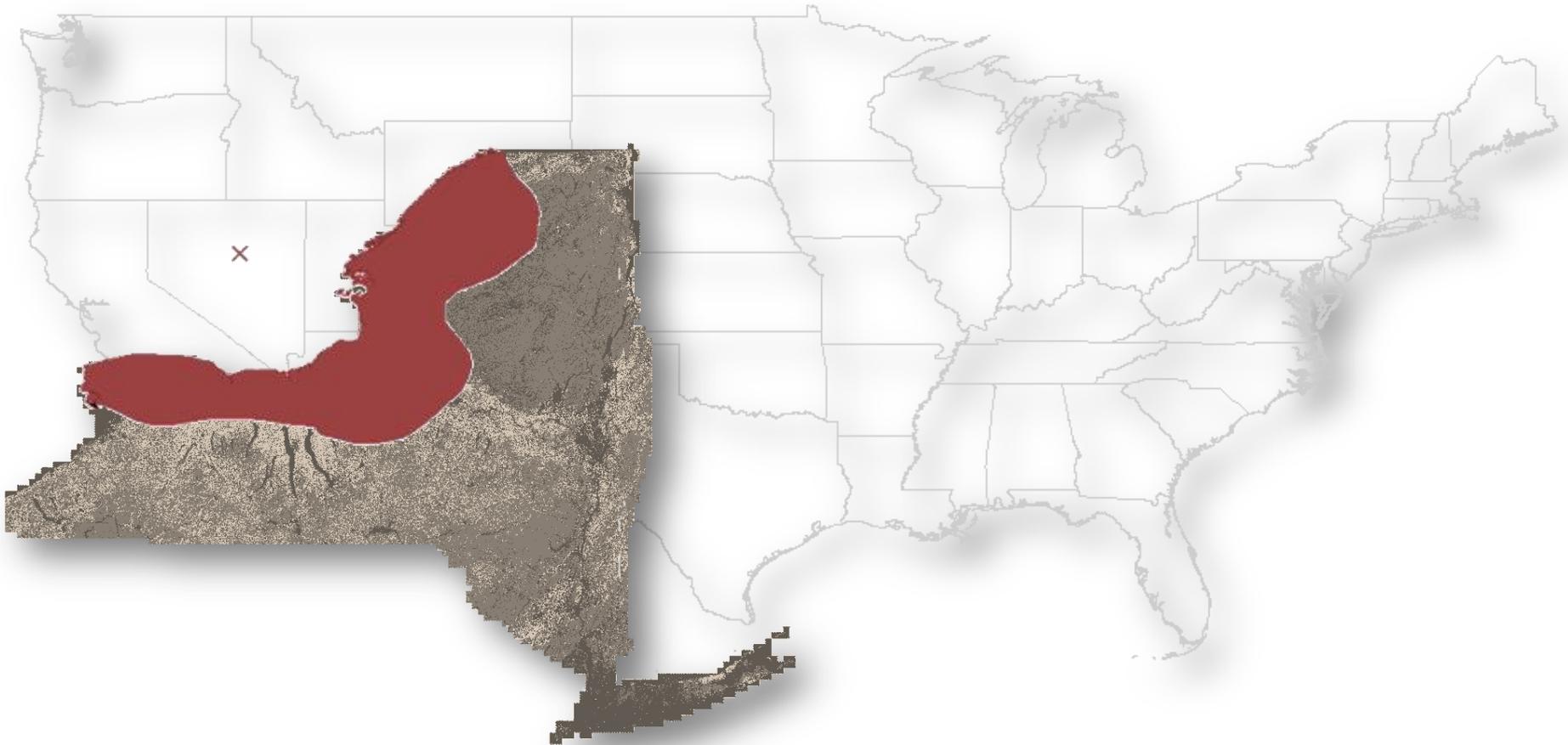
Range Shifts



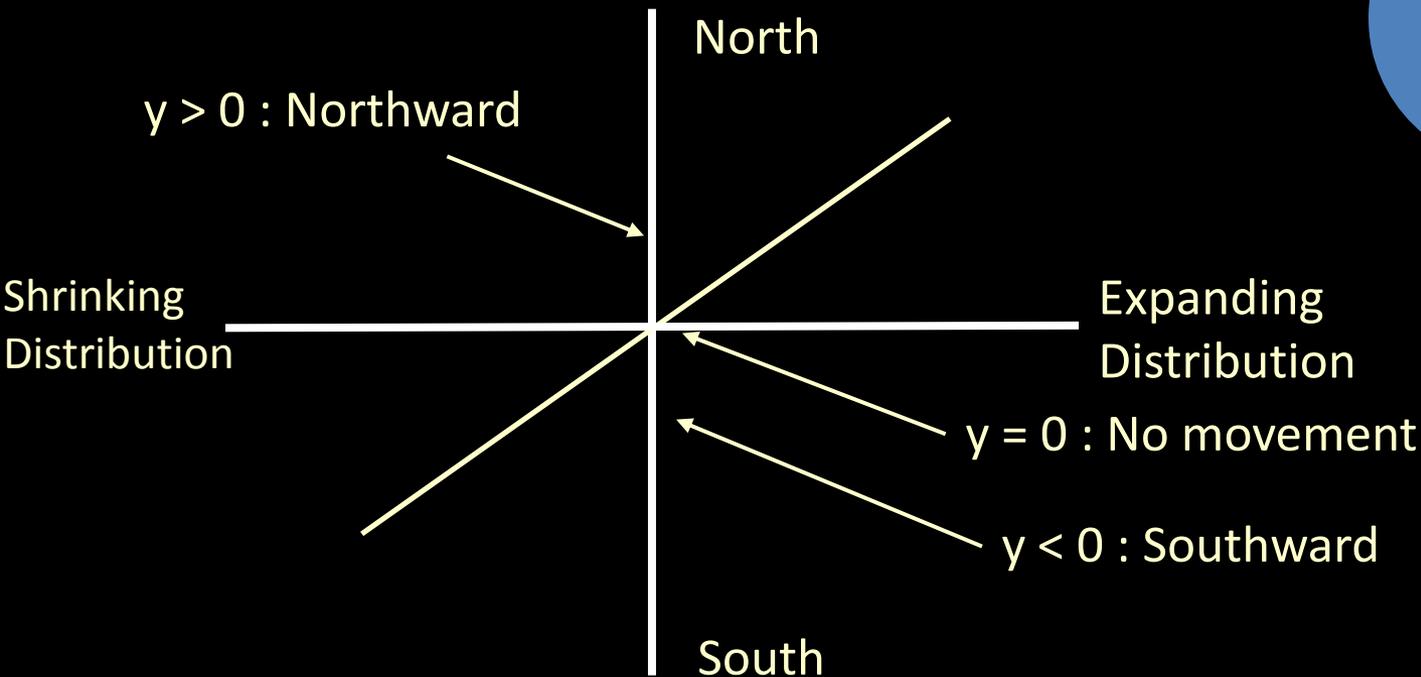
Range Shifts



Range Shifts



Atlases control for big changes



Birds are Shifting Polewards

Great Britain

(Thomas and Lennon 1999)

Finland

(Brommer 2004)

New York State

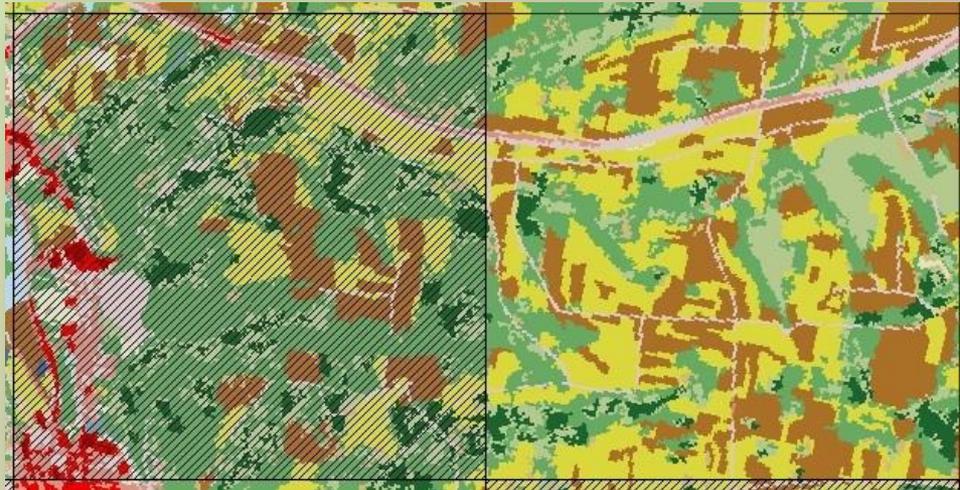
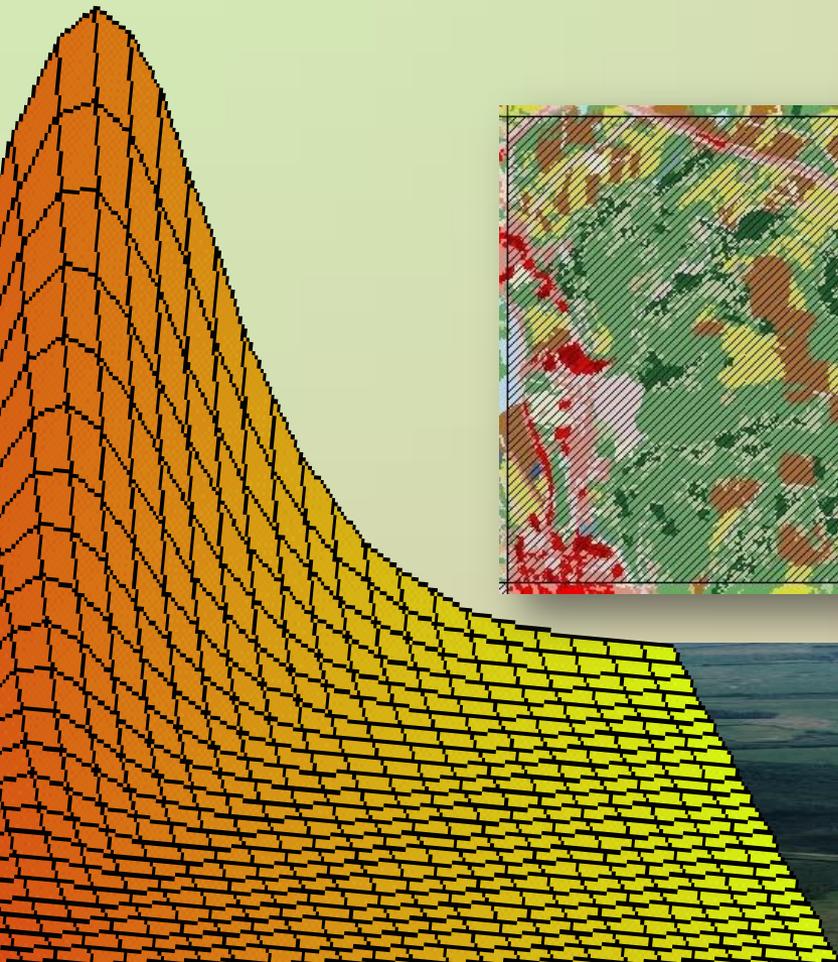
(Zuckerberg et al. 2009)

“...over half, and perhaps two-thirds, of observed animal range boundaries have already shown a response to 1970-2000 anthropogenic warming”

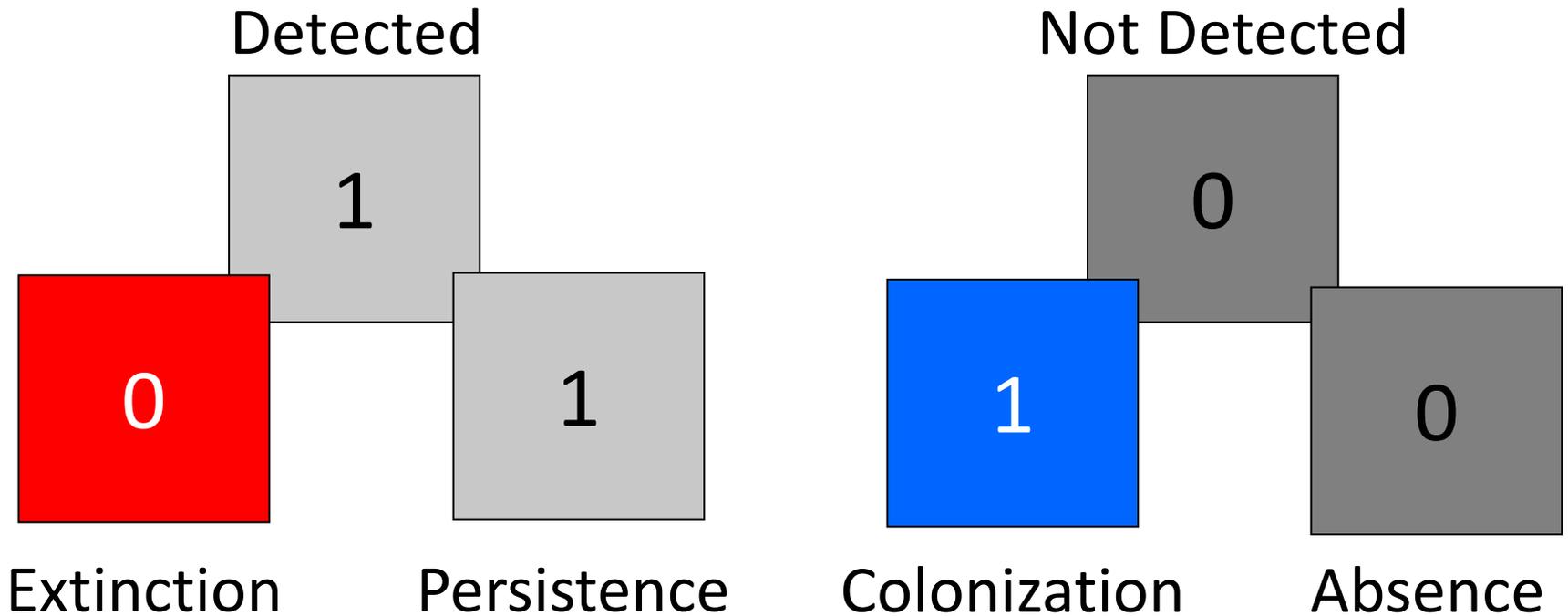
C.Thomas (2010, Div. and Dist.)



Habitat Loss



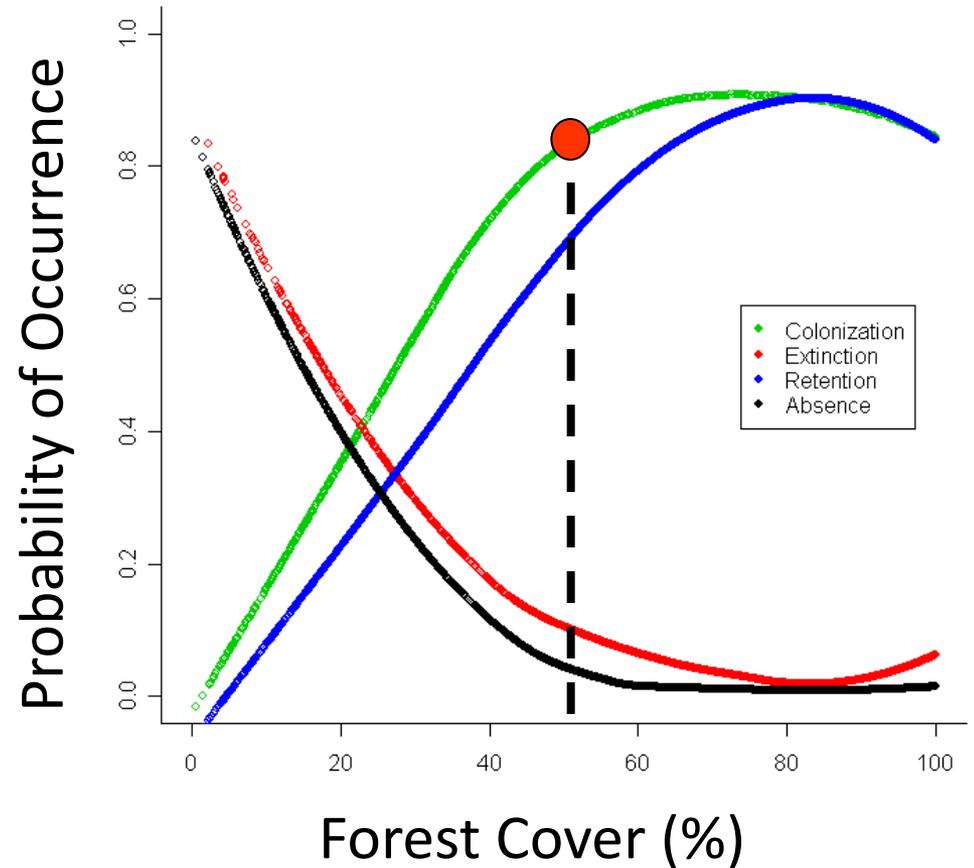
Change is Powerful



Ecological thresholds

Forest cover

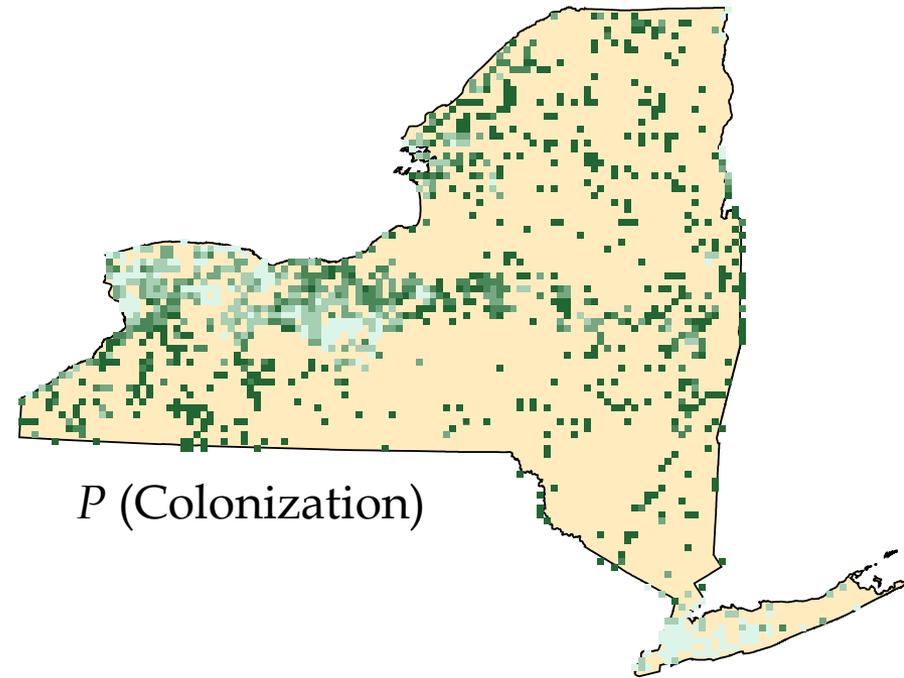
Forest breeding birds



50% forest cover

Ecological thresholds

Thresholds pervasive
Populations on the brink
Species distributions

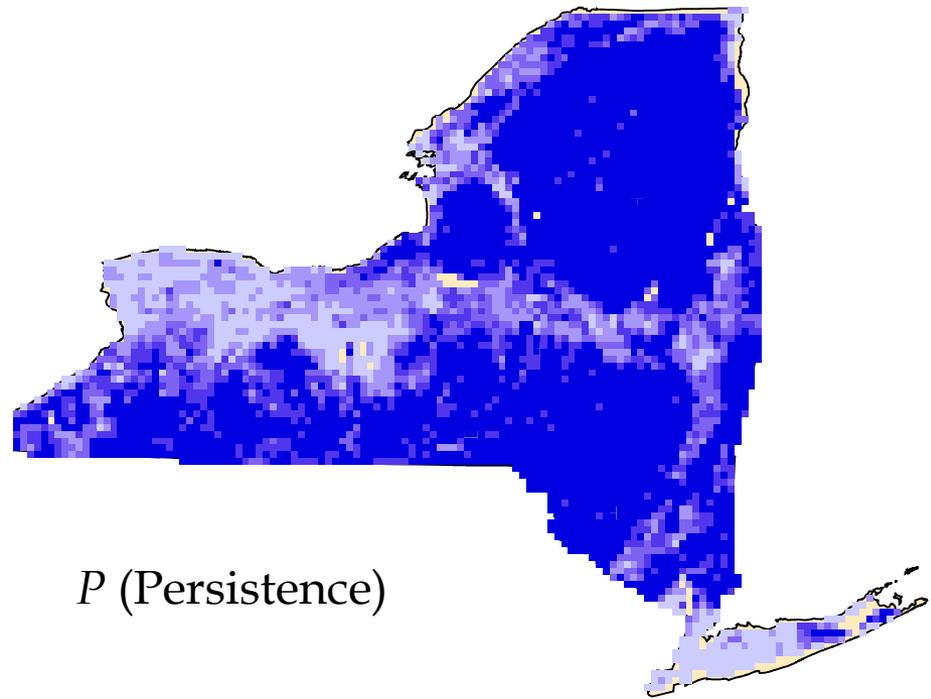


© Michael J. Hopiak/CLO

Zuckerberg and Porter. 2010.
Biological Conservation.

Ecological thresholds

Thresholds pervasive
Populations on the brink
Species distributions



P (Persistence)

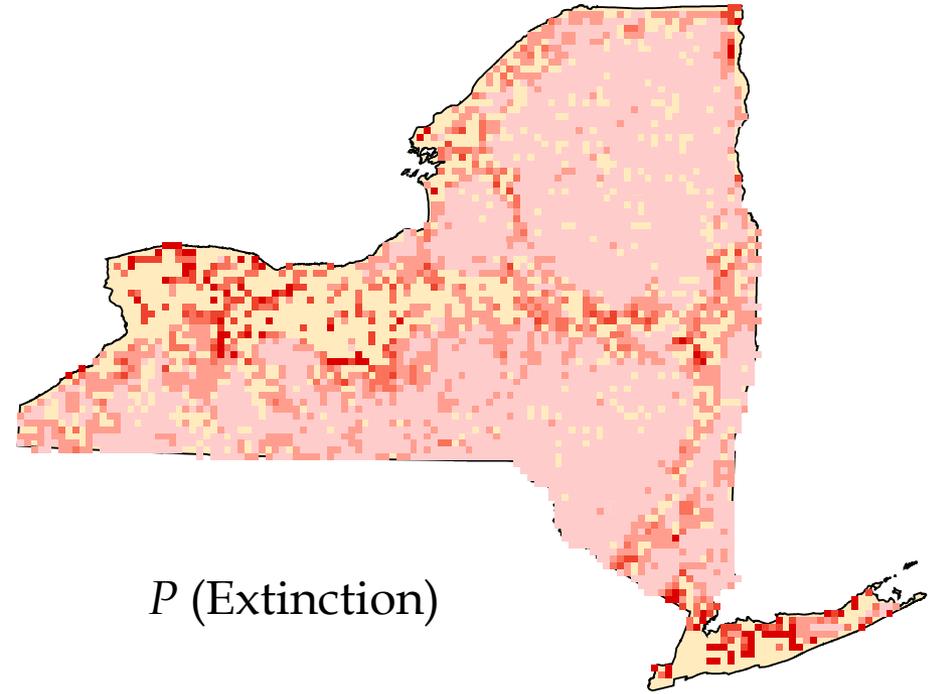


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Zuckerberg and Porter. 2010.
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Ecological thresholds

Thresholds pervasive
Populations on the brink
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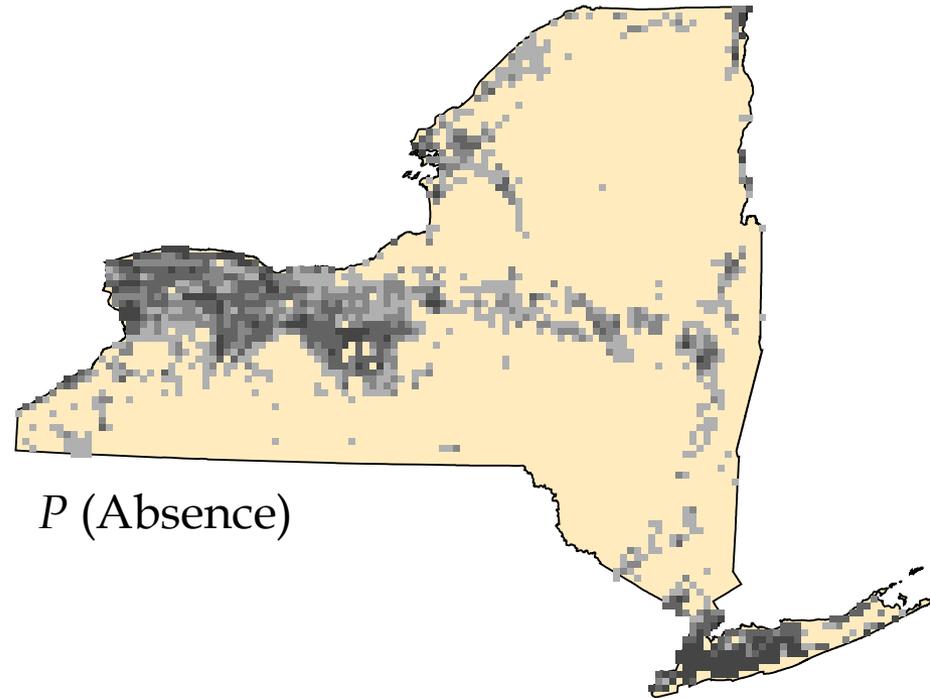
P (Extinction)



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Ecological thresholds

Thresholds pervasive
Populations on the brink
Species distributions



P (Absence)

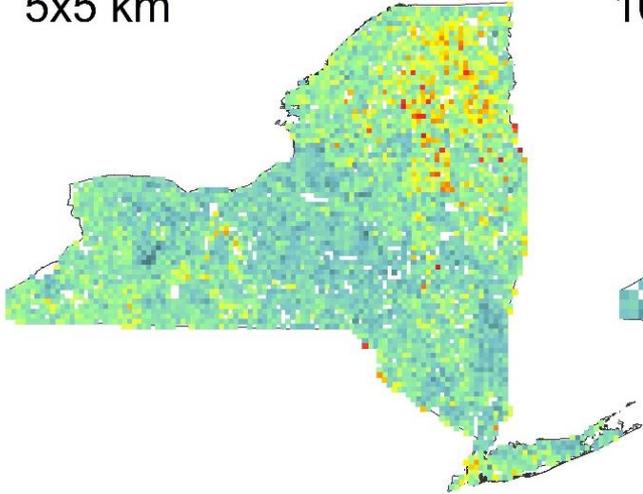


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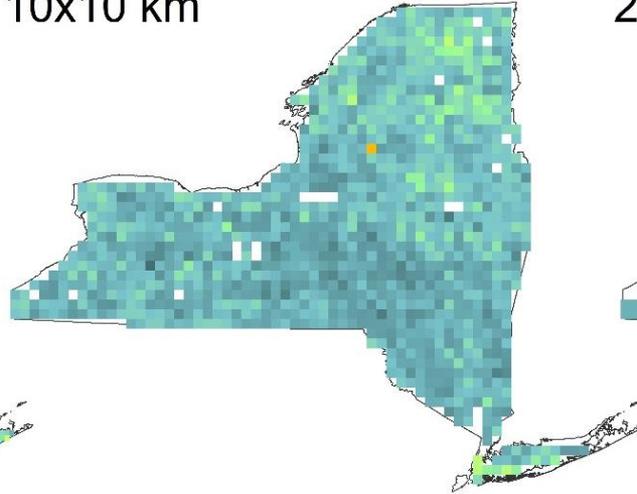
Zuckerberg and Porter. 2010.
Biological Conservation.

Changes in Communities

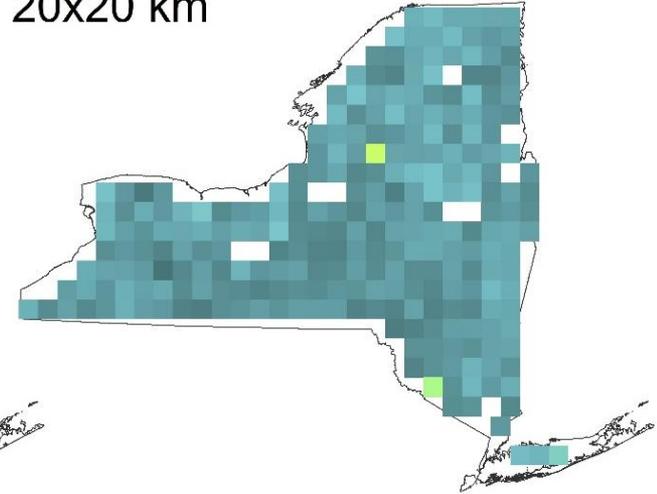
5x5 km



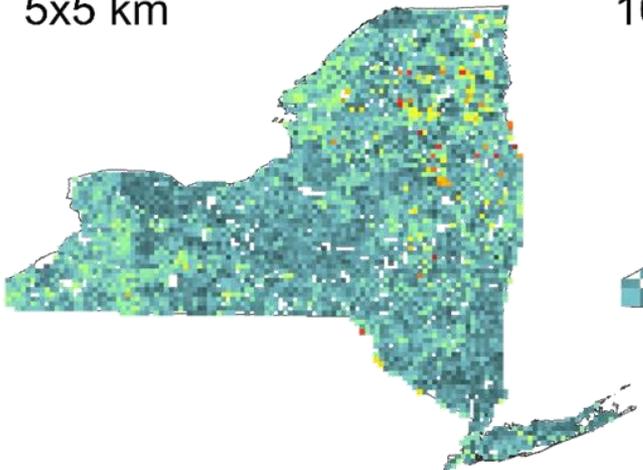
10x10 km



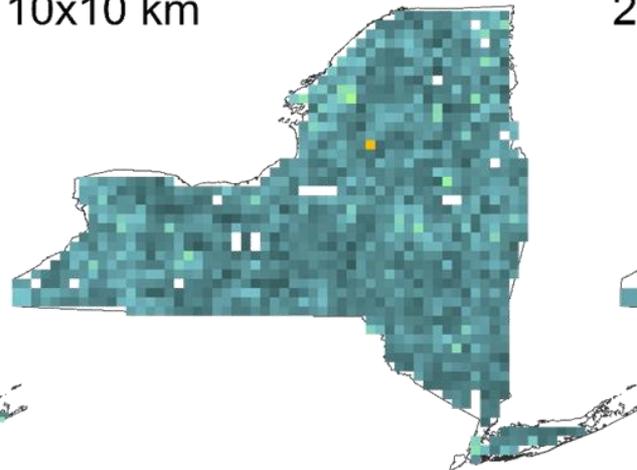
20x20 km



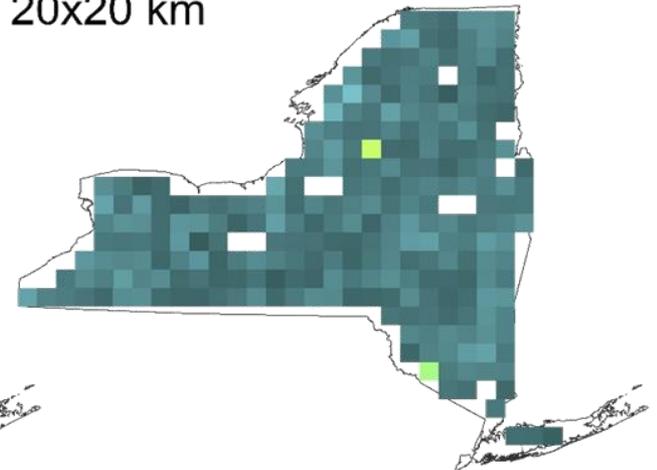
5x5 km



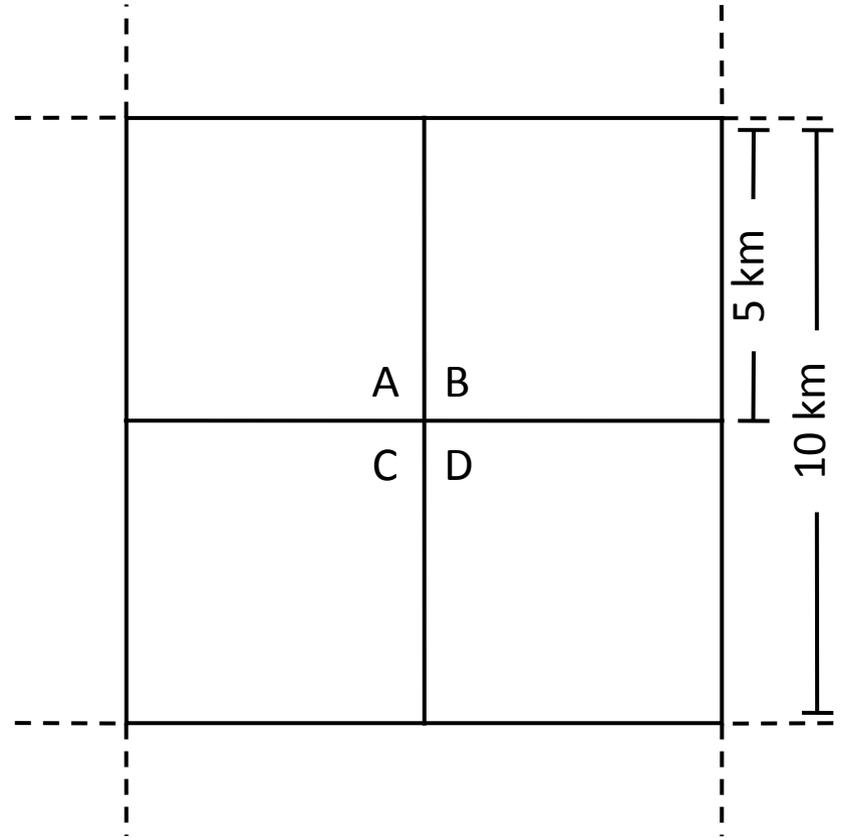
10x10 km



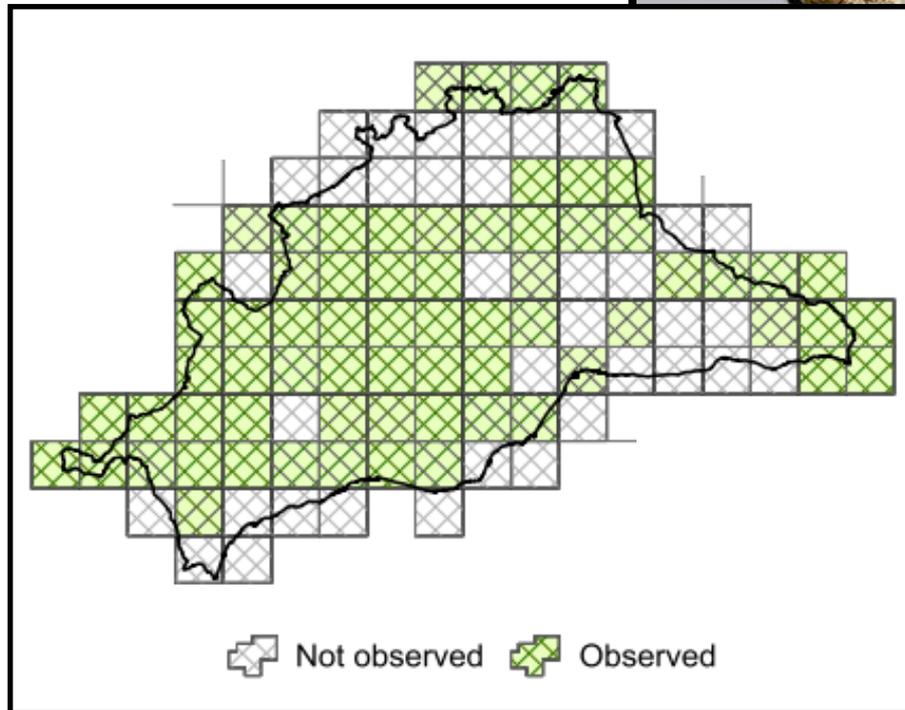
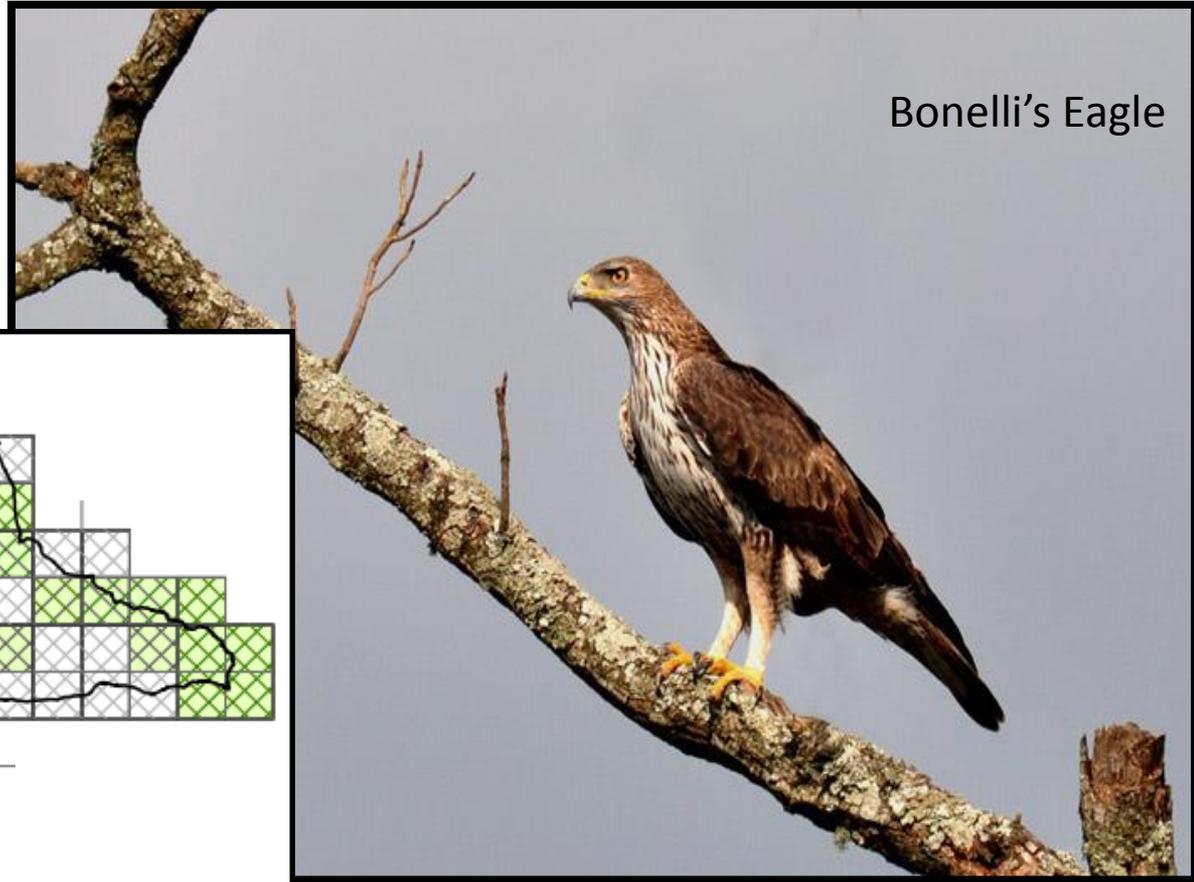
20x20 km



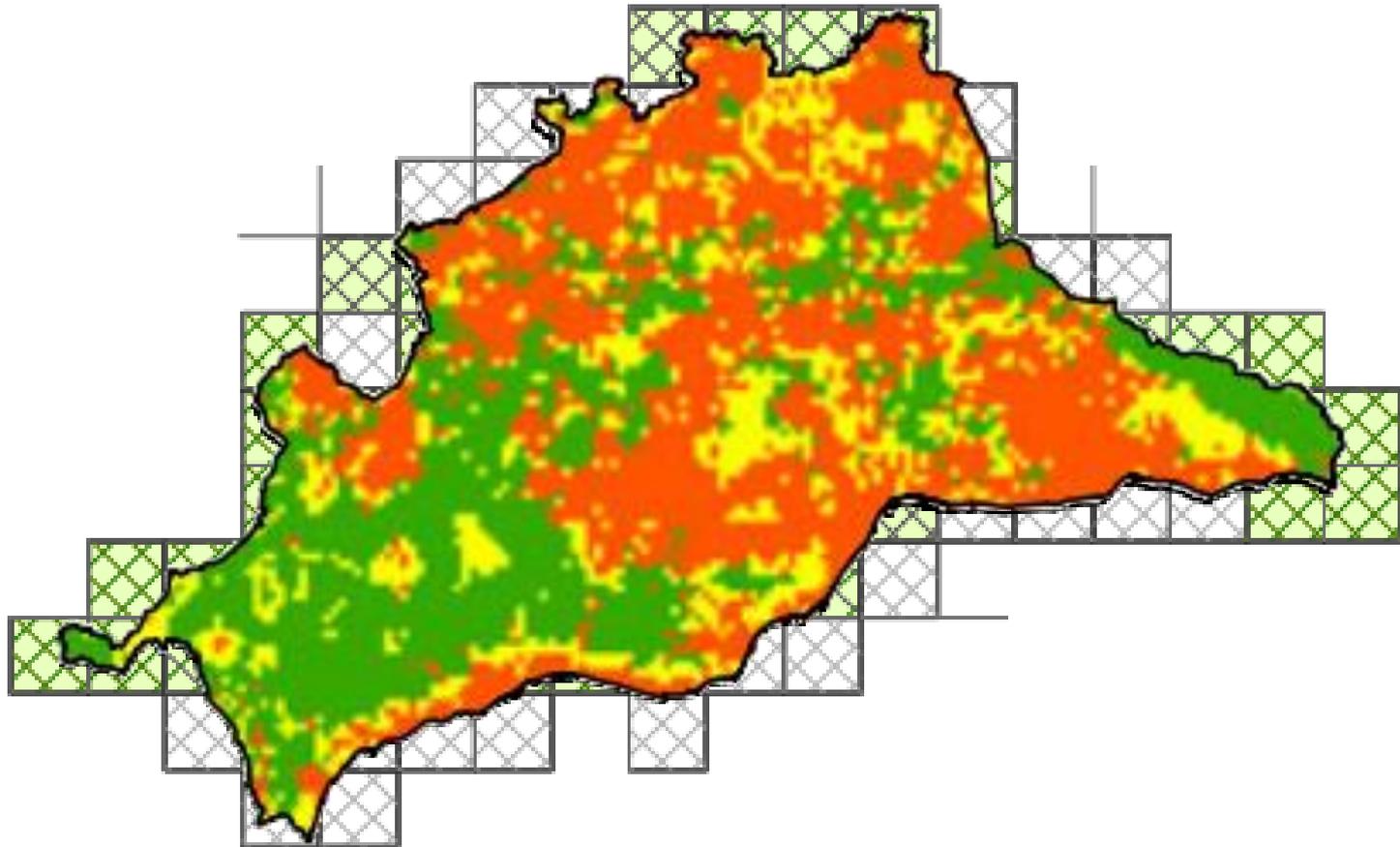
Finessing atlas data



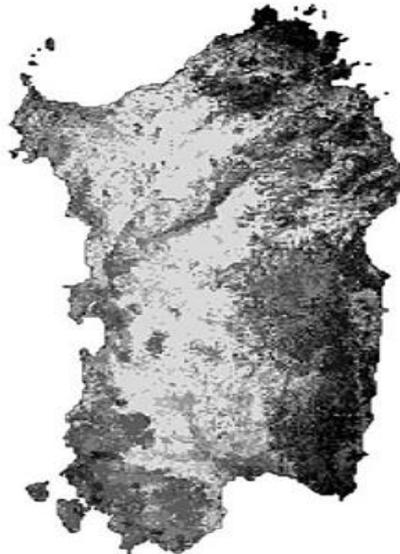
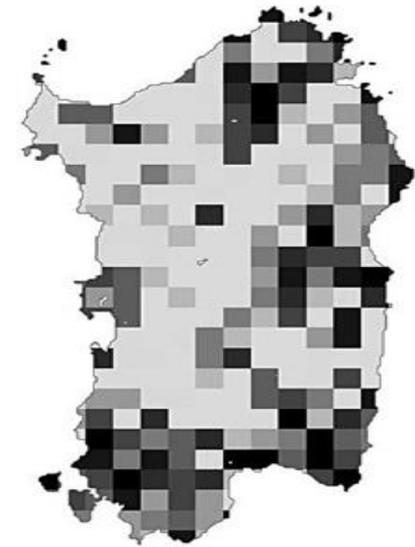
Finessing atlas data



Finessing atlas data



Conservation Areas



Species richness Conservation value

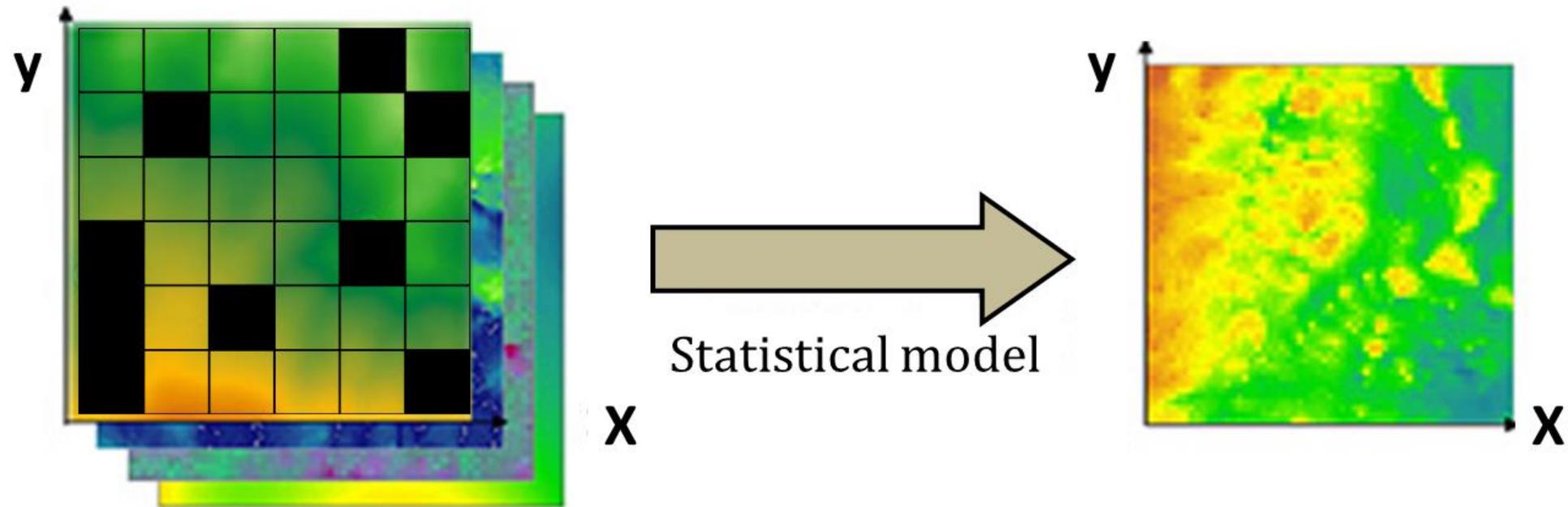
Space-based Ornithology



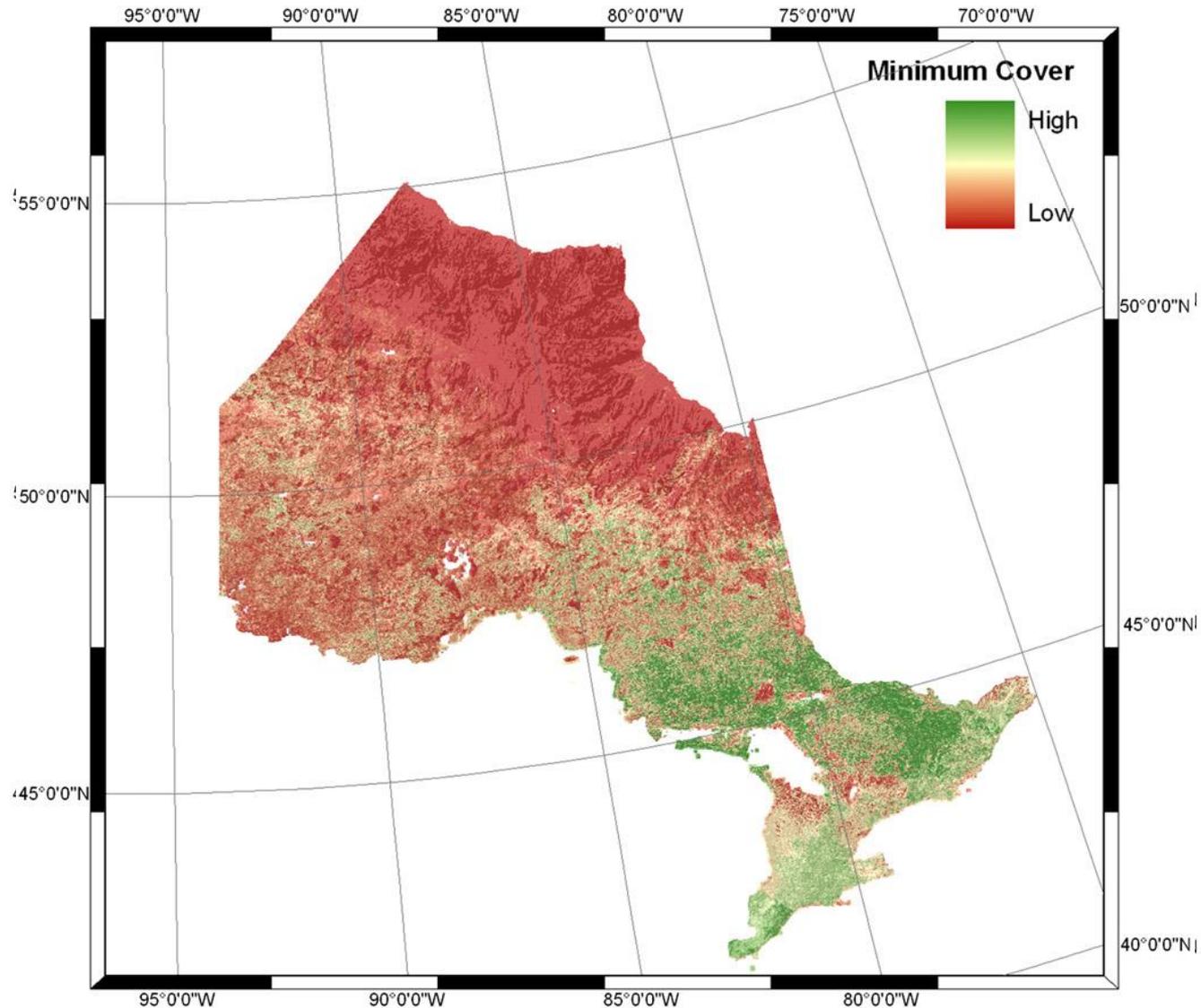
Modeling bird distributions

Statistical relationships of birds and their environment

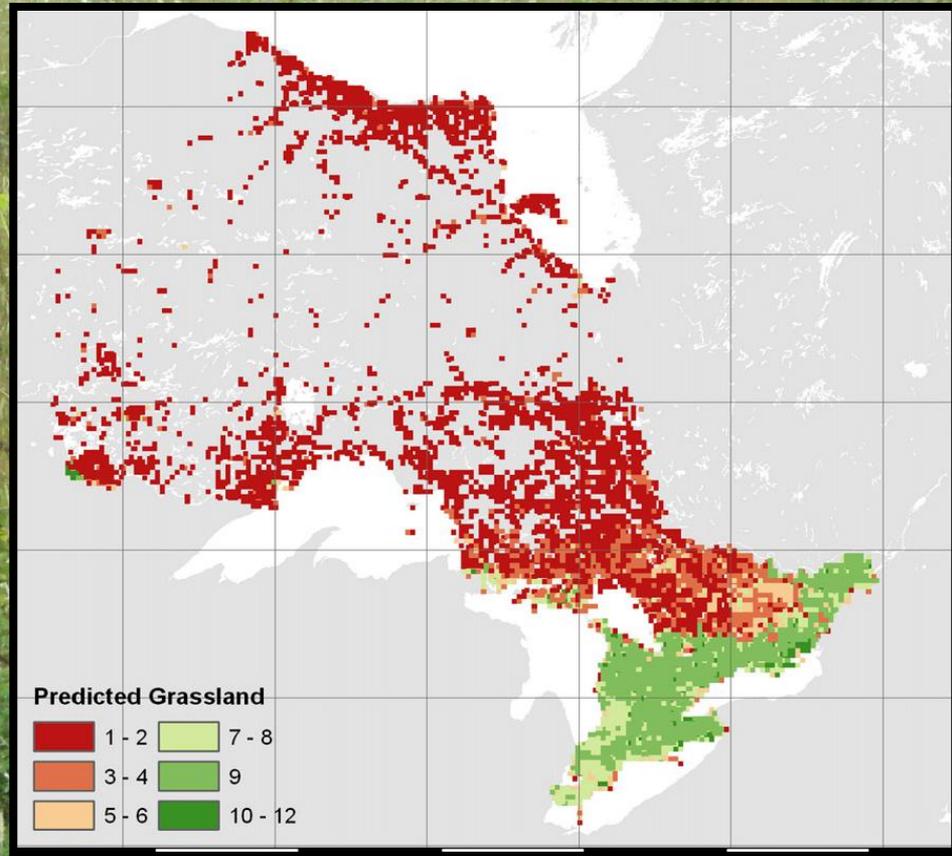
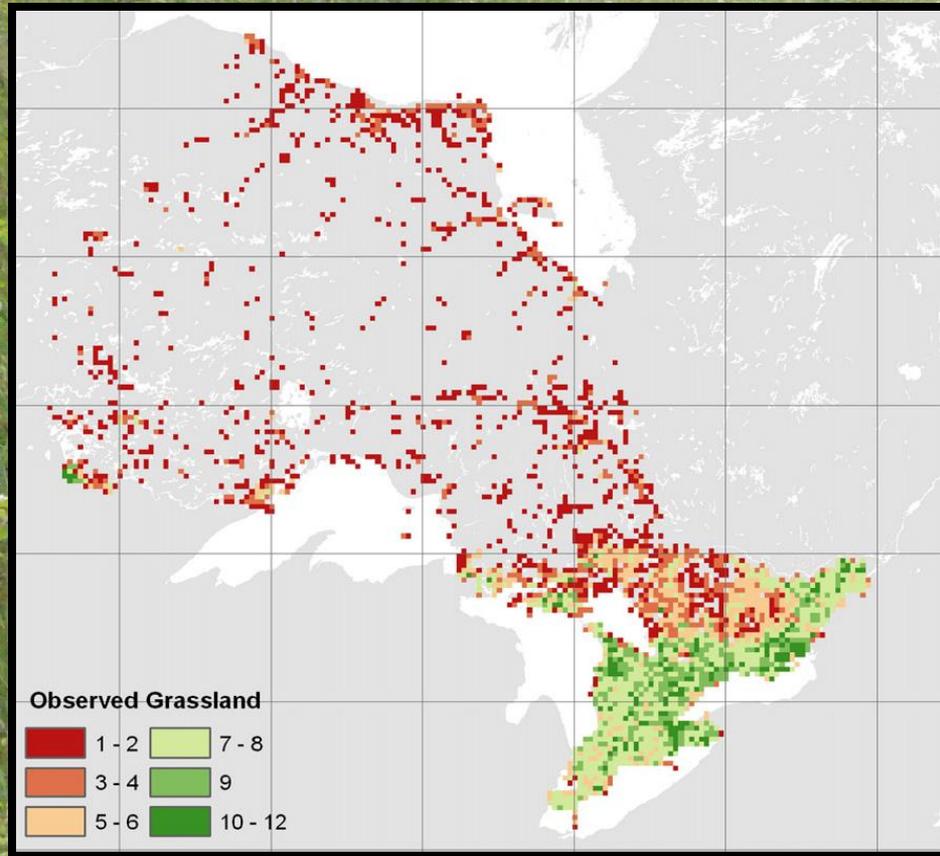
Map of species distributions (present and future)



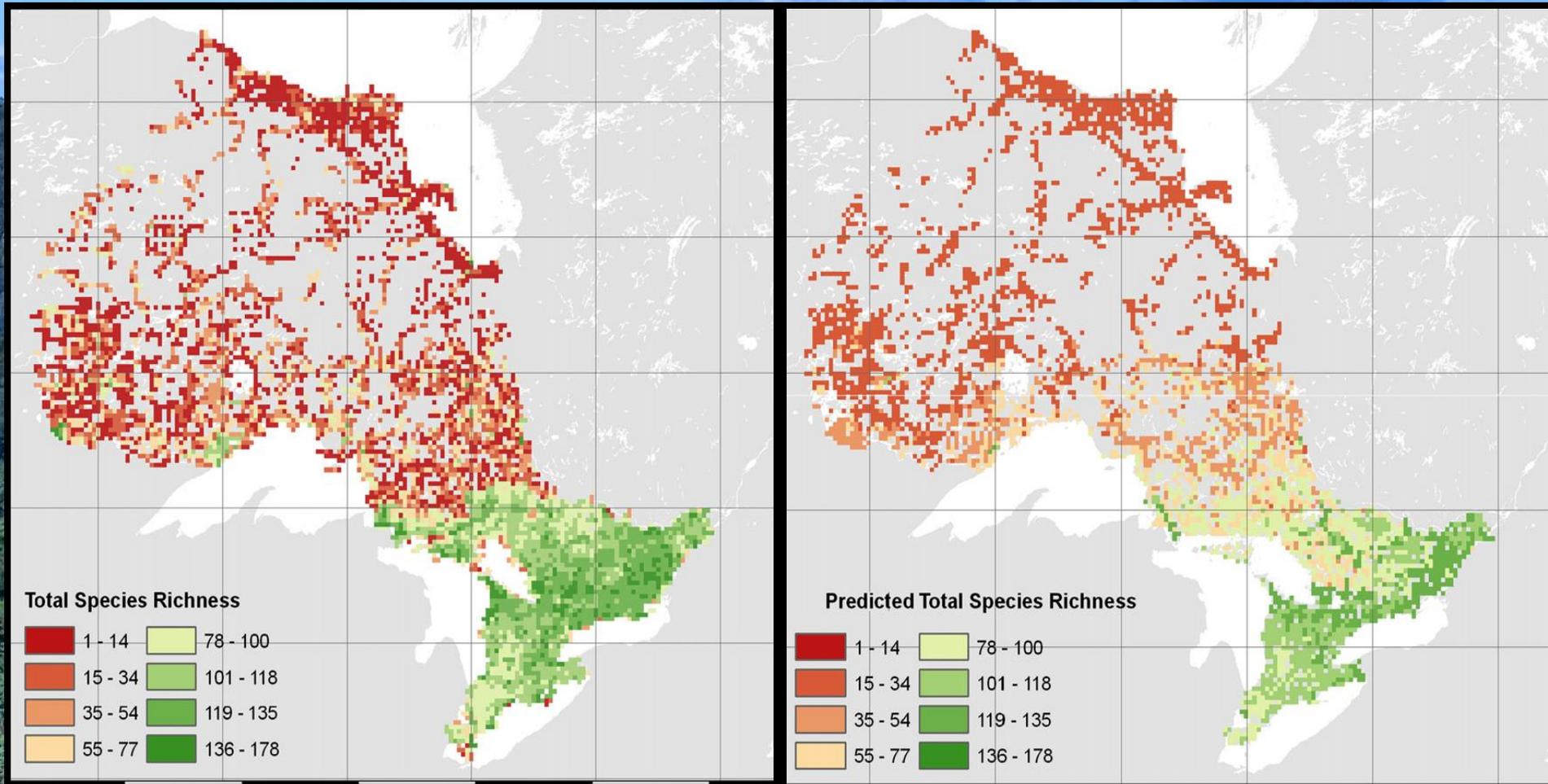
Space-based Ornithology



Space-based Ornithology



Space-based Ornithology



Survey Effort

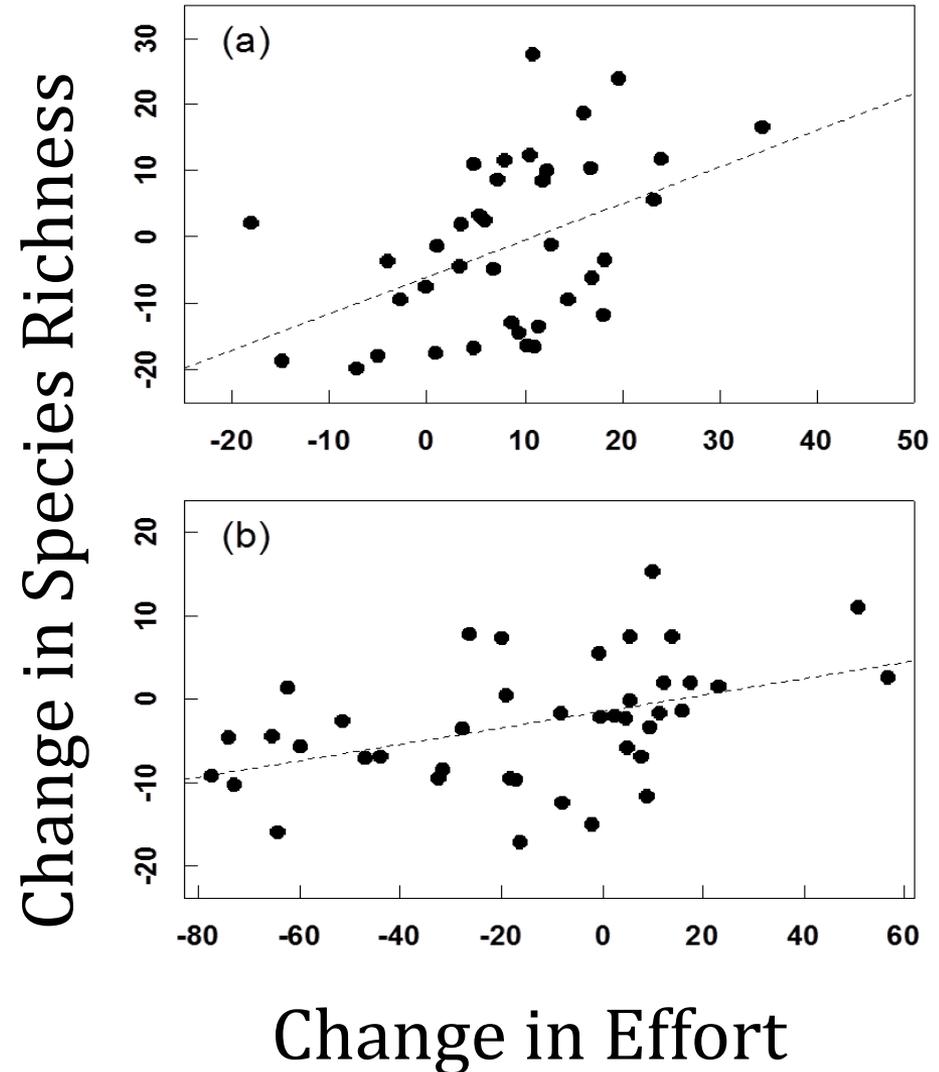
Why do we need information on effort?

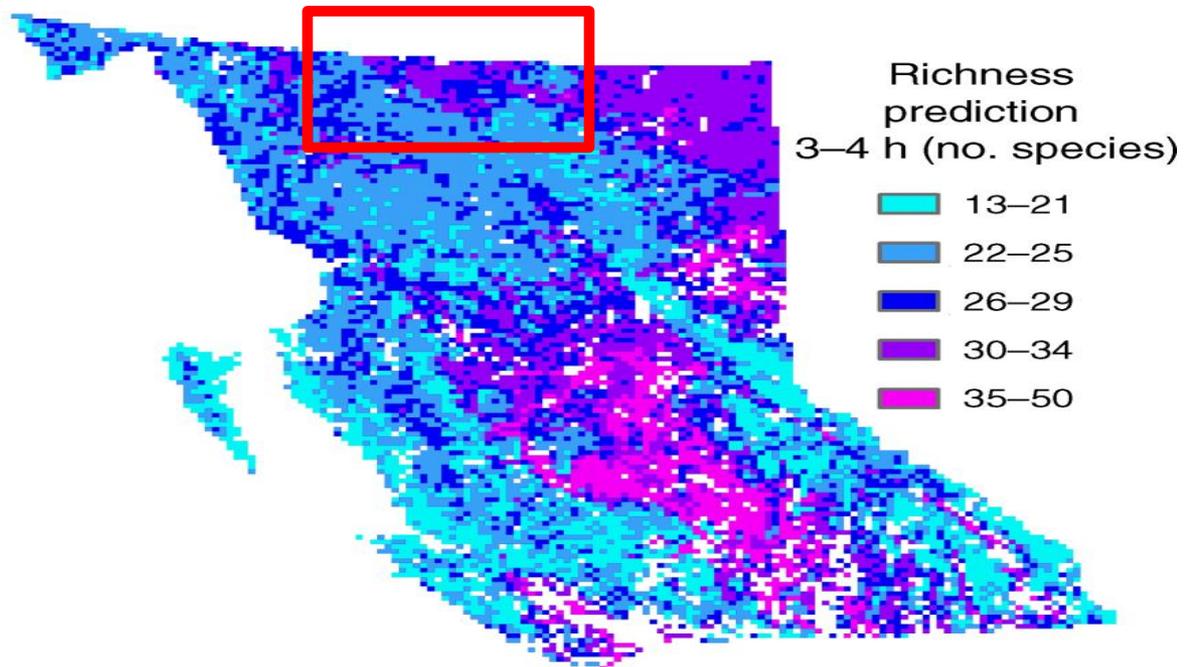
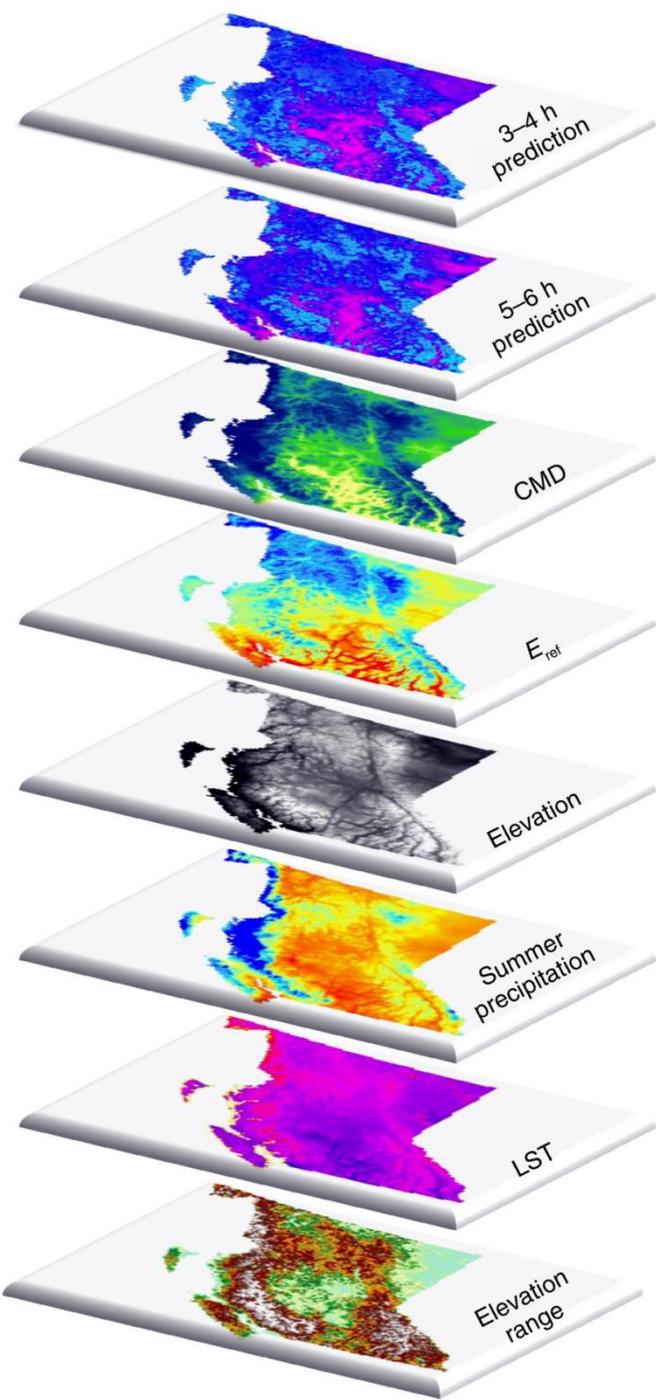


Helps paints a clearer picture!

Range Margin Shifts Re-visited

Britain, Finland, and NY
Effort along range
boundaries has changed





Not just making pretty maps

Atlases are a critical tools in science

Abundance-Distribution

Global change

Habitat loss

Conservation planning

Space-based ornithology



Decentralization of Science

Less and less skepticism
Value of public participation
Widening the circle of science



Foot soldiers of science and conservation

