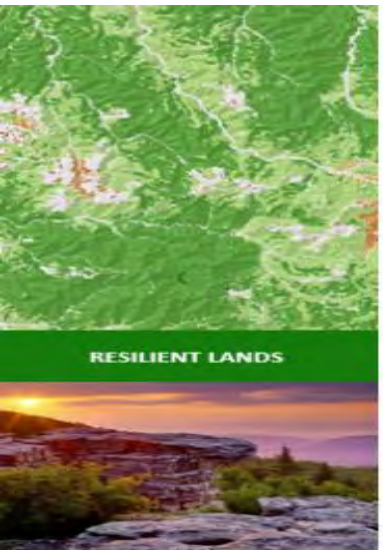
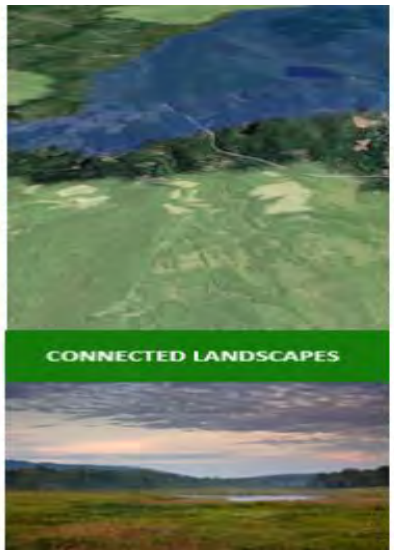
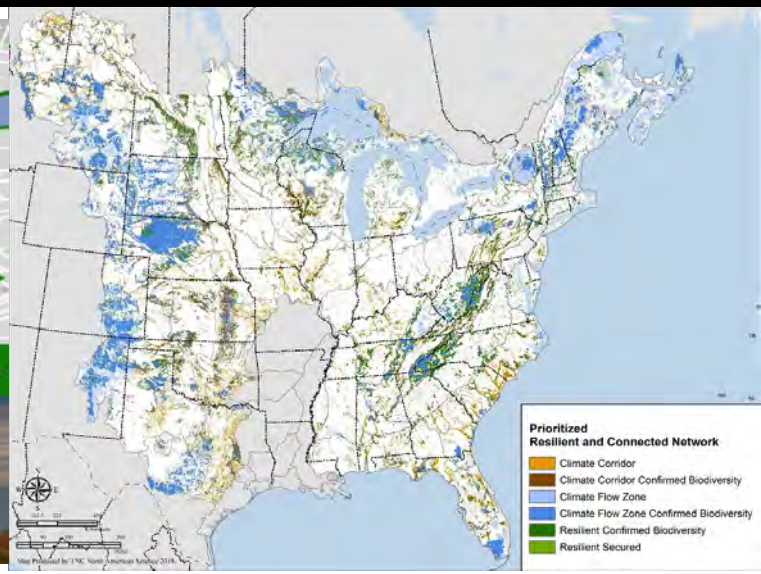
Resilient and Connected Landscapes

to Sustain Diversity under Climate Change



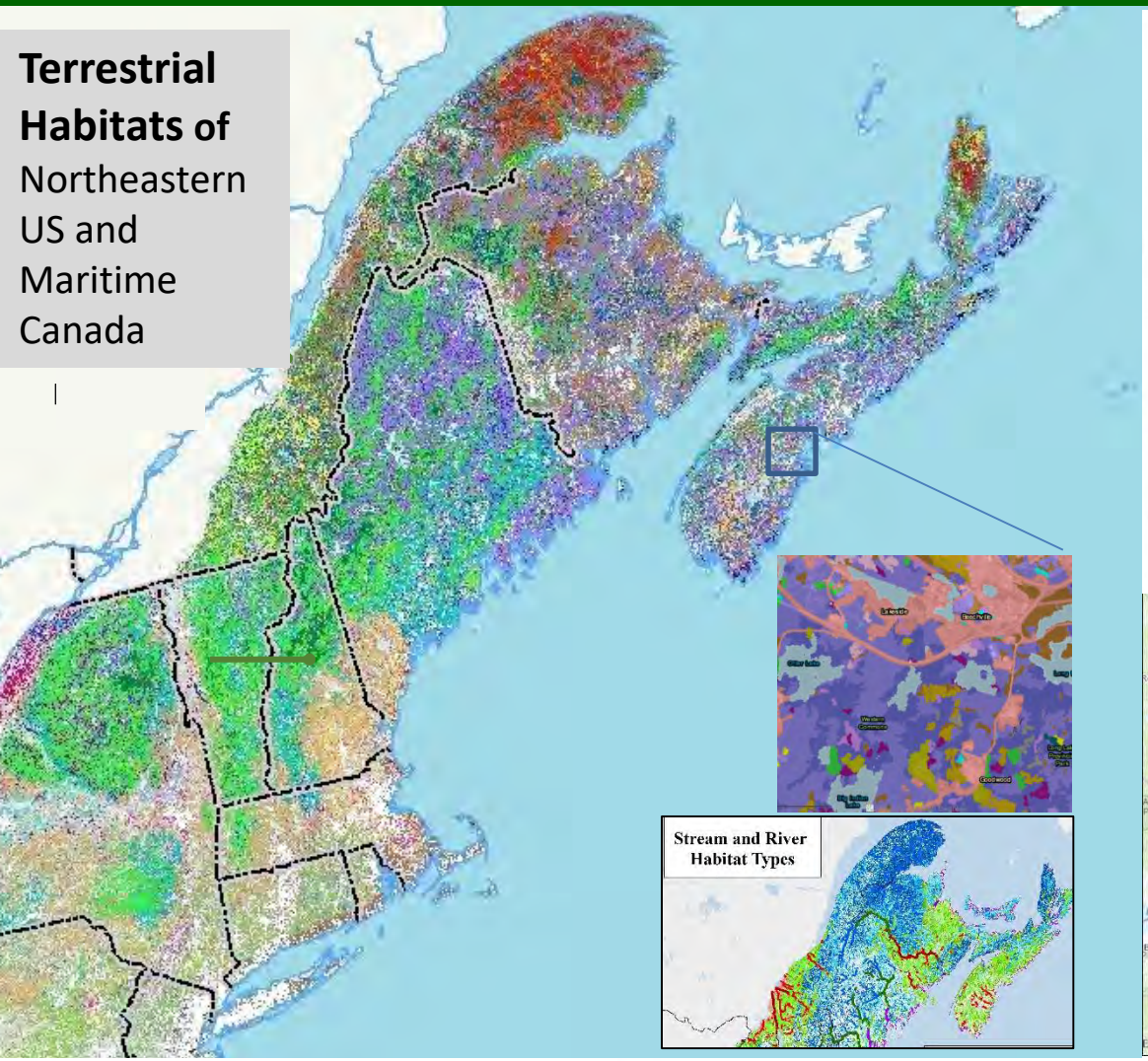




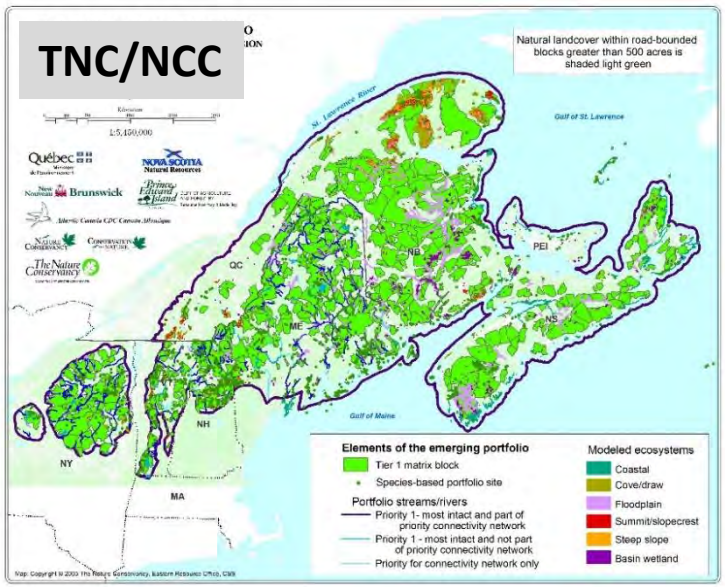
Mark Anderson PhD. Director of Conservation Science, TNC Eastern

A Productive Partnership

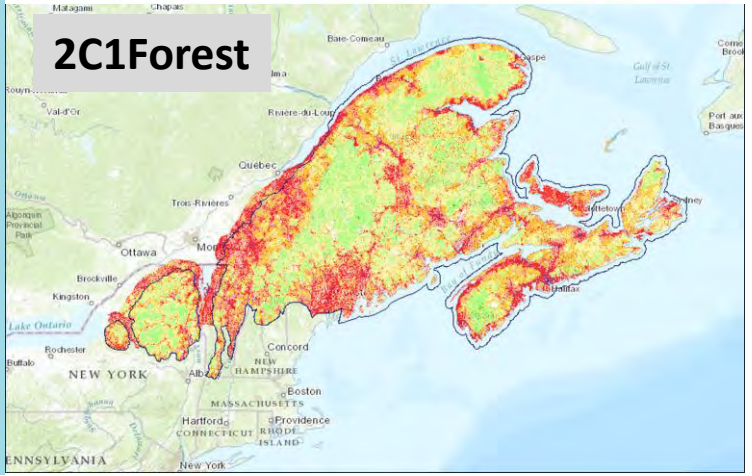
Terrestrial Habitats of Northeastern US and Maritime Canada



TNC/NCC



2C1Forest



North Atlantic LCC
North Atlantic Landscape

NECSC Northeast Climate Science Center

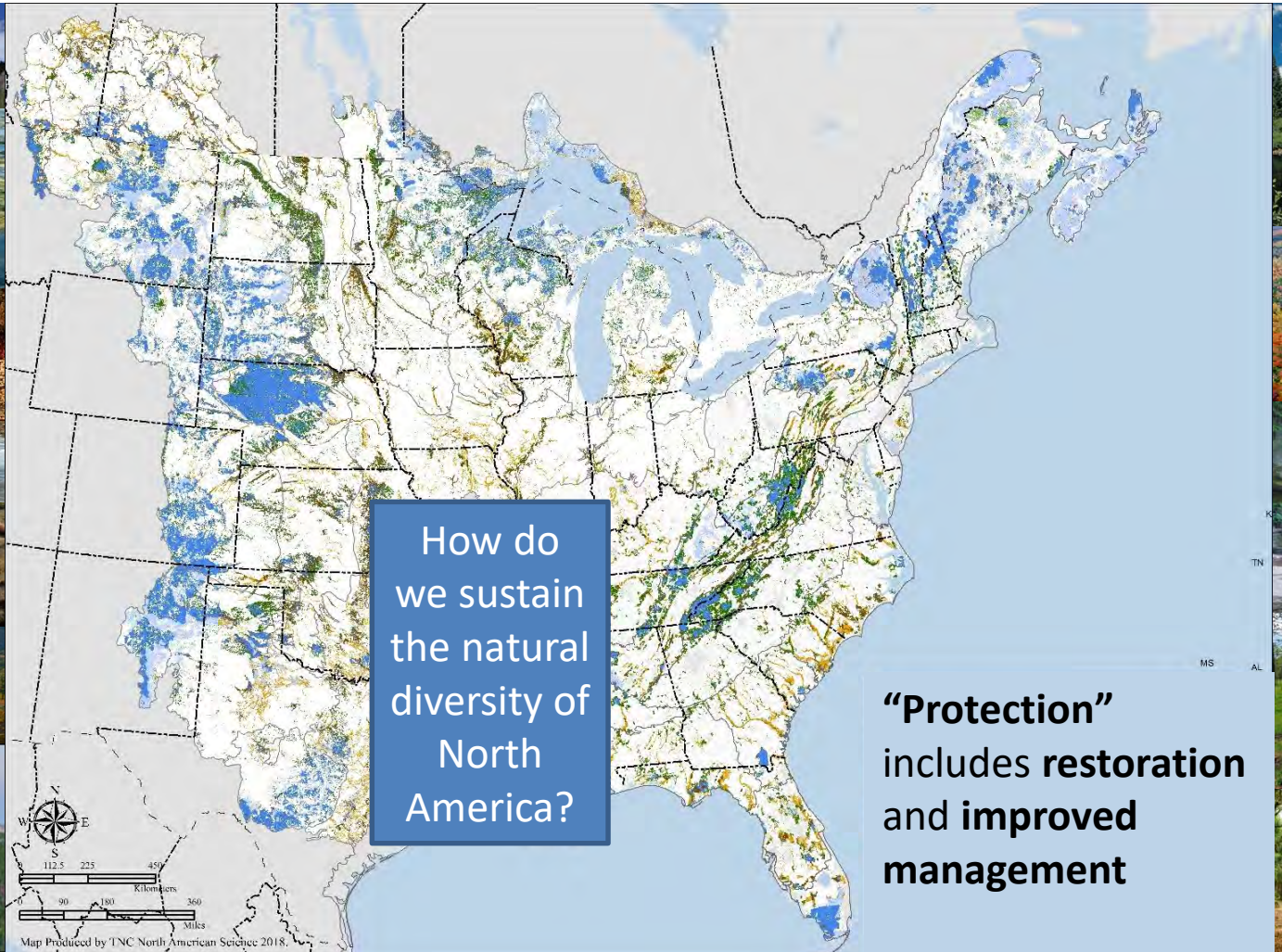
Nature Conservancy Canada | Conservation de la nature Canada

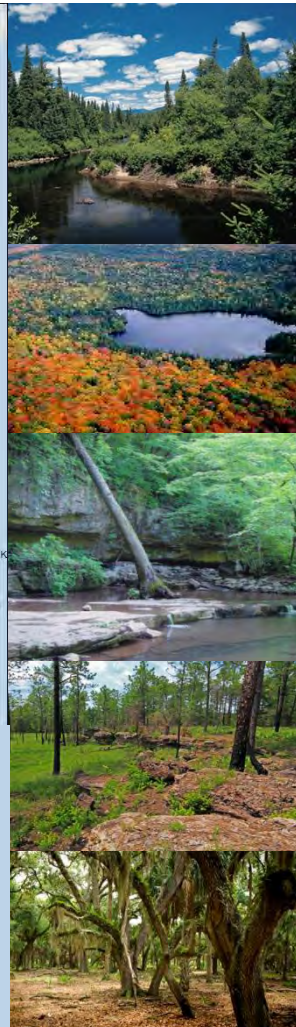
Atlantic Canada

Protect Land and Water Priority

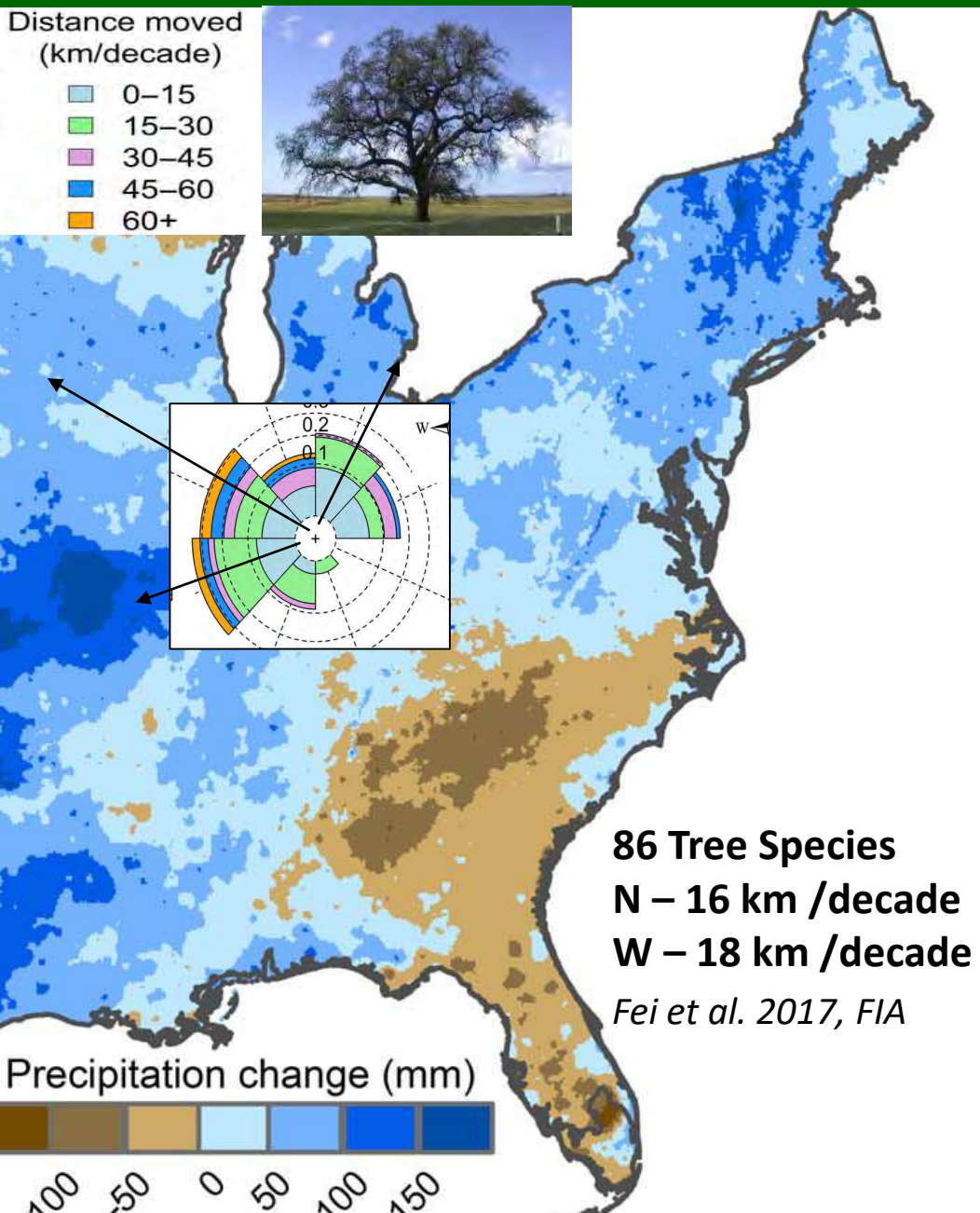
TNC North America

Conserve a network of resilient sites and connecting corridors that will sustain North America's natural diversity by allowing species to adapt to climate impacts and thrive.

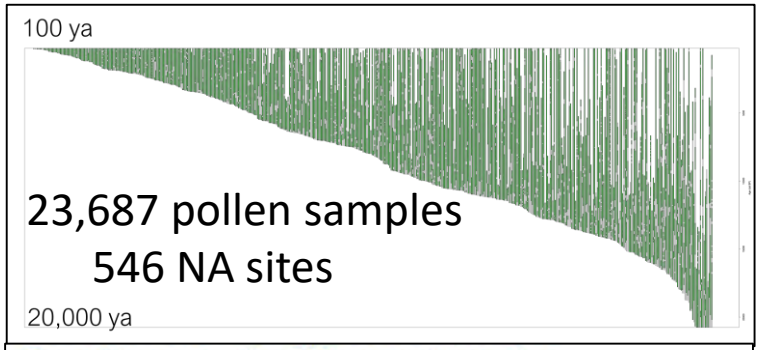


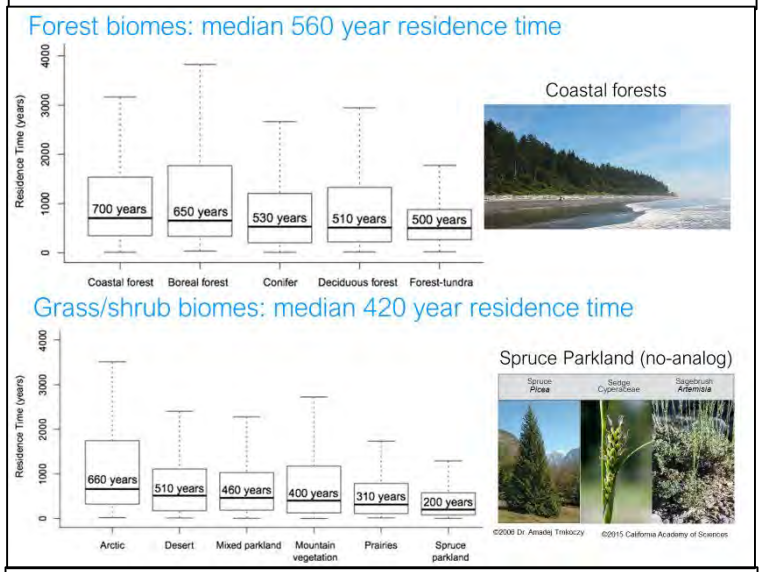


Nature is Dynamic



86 Tree Species
N – 16 km /decade
W – 18 km /decade
Fei et al. 2017, FIA

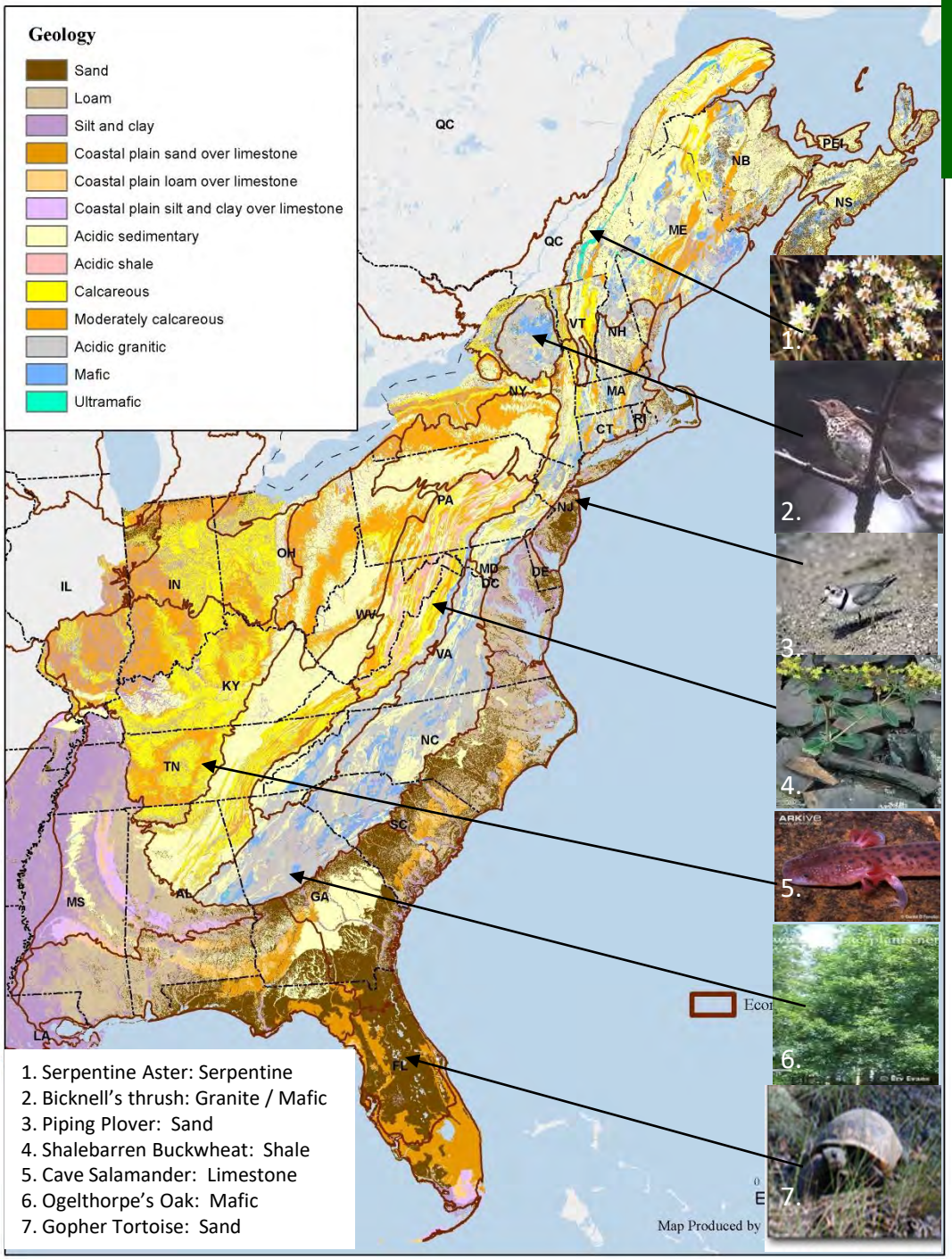




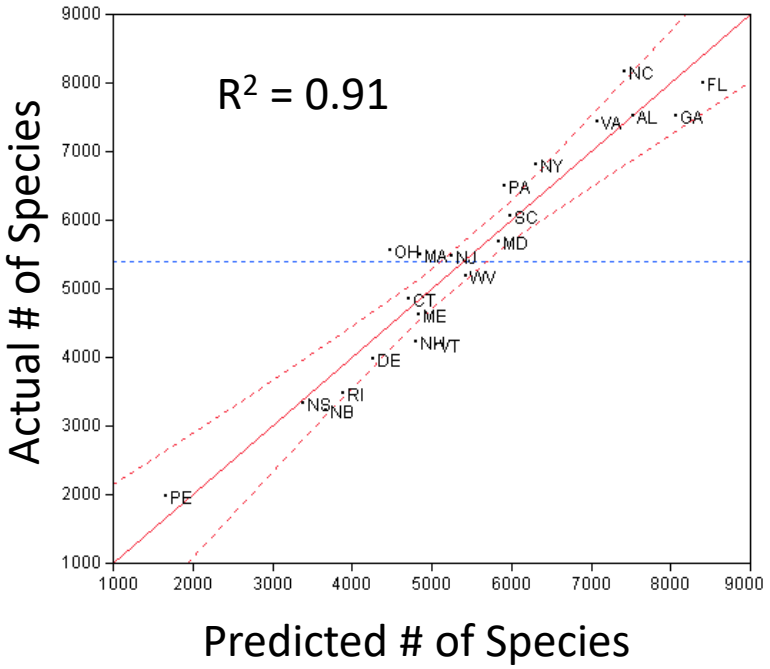
Median residence times range from **200-700** years (overall **500** years) and are shorter during times of warming *McGuire et al. in prep*

Representation

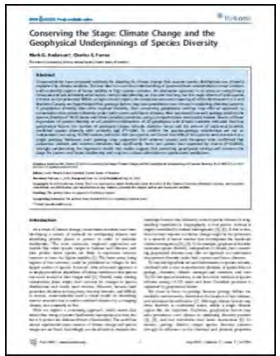
Conserving Nature's Stage



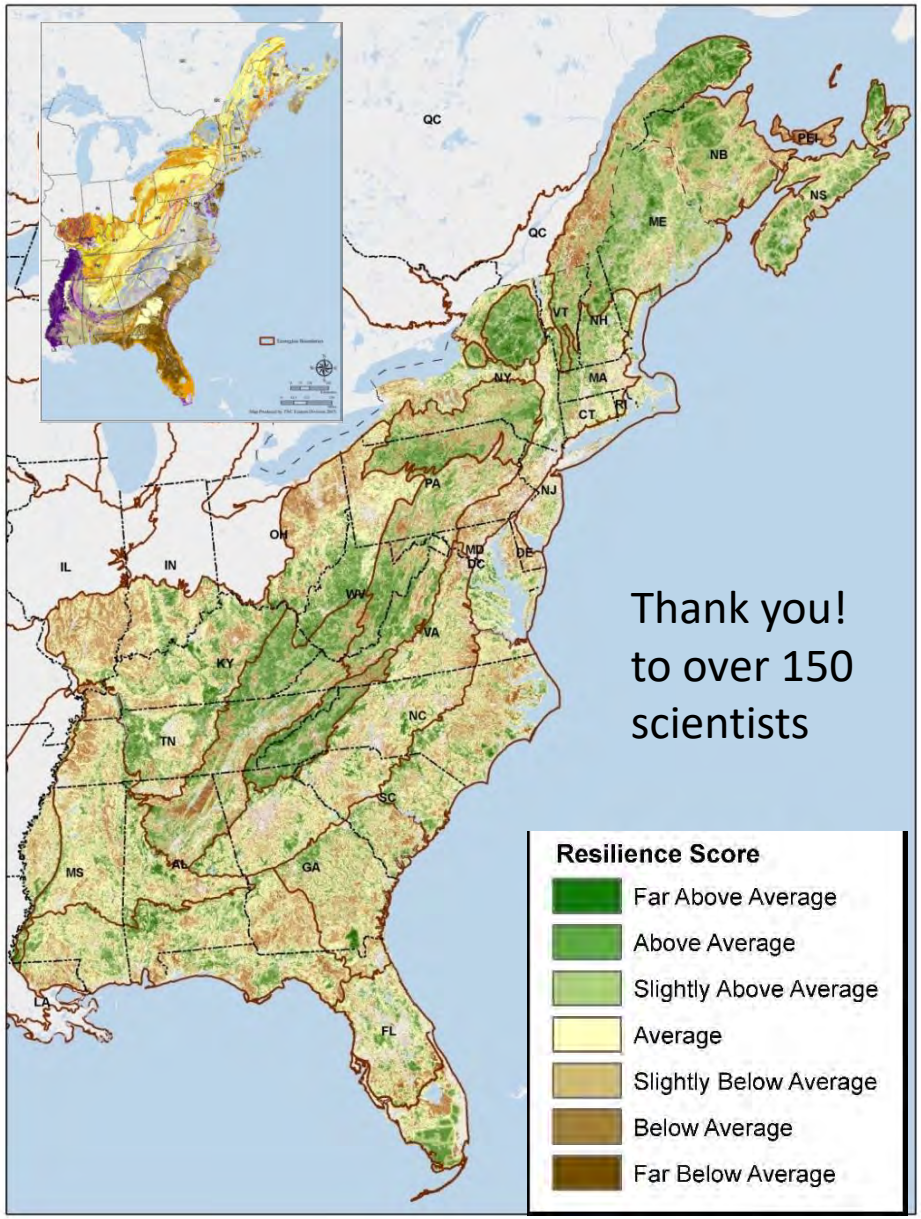
1. Serpentine Aster: Serpentine
2. Bicknell's thrush: Granite / Mafic
3. Piping Plover: Sand
4. Shalebarren Buckwheat: Shale
5. Cave Salamander: Limestone
6. Ogelthorpe's Oak: Mafic
7. Gopher Tortoise: Sand



Biological diversity is highly correlated with **Ecoregions** and **Land Properties** (Geology, Soil, Topography)



Site Resilience



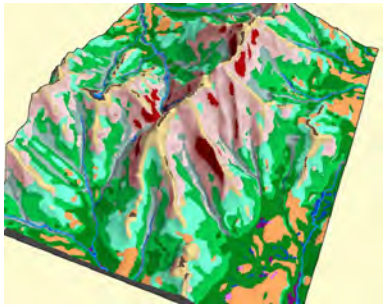
Thank you!
to over 150
scientists

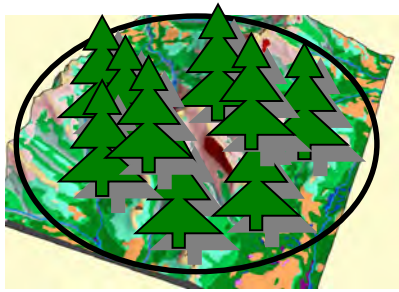
Resilient sites = sites that continue to support biological diversity, productivity and ecological function even as they change in response to climate change.

Choose among options based on:

Many Microclimates
Create climate options

Locally Connected
Allows species to move

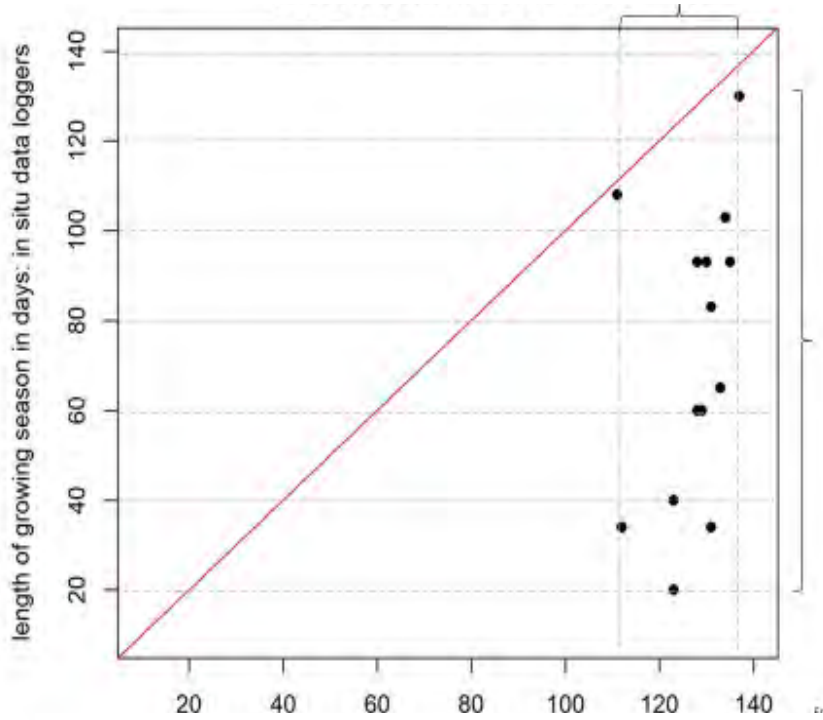




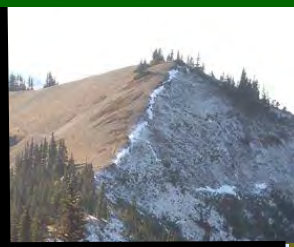
Resilience / Microclimates

Topography and Moisture create Species-relevant Microclimates

Temp from 4 km Climate Model



Actual Temp measured at 1 m

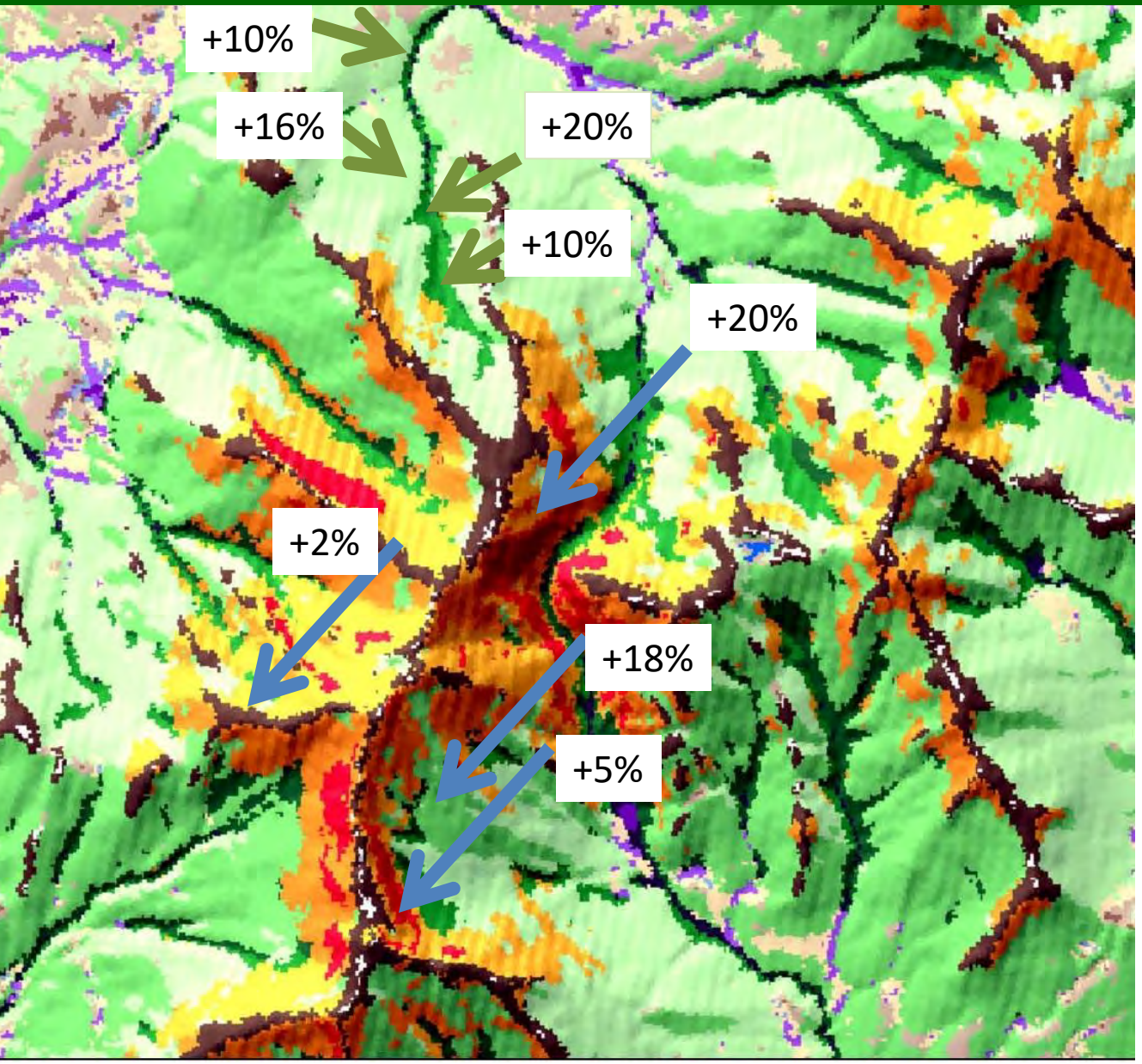


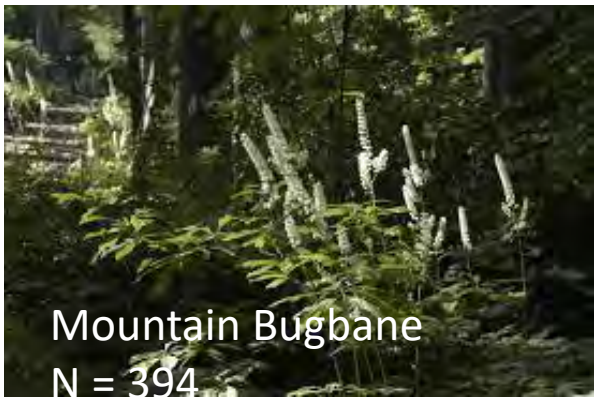
N=178

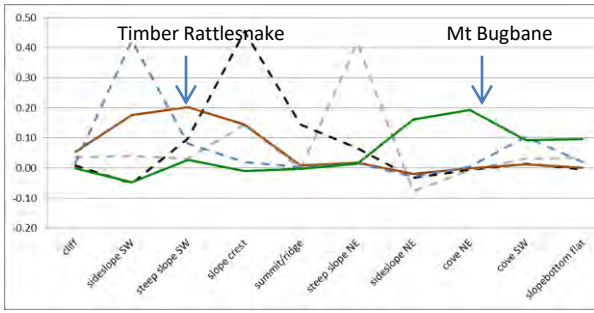
Langdon in prep 2018.
(PRISM 4 km gridded data) and temperatures measured at 1 m above the ground in peatlands in the Adirondacks

Species Relevant Micro-Climates

%AE – Percent Above Expected based on known locations in Northeast

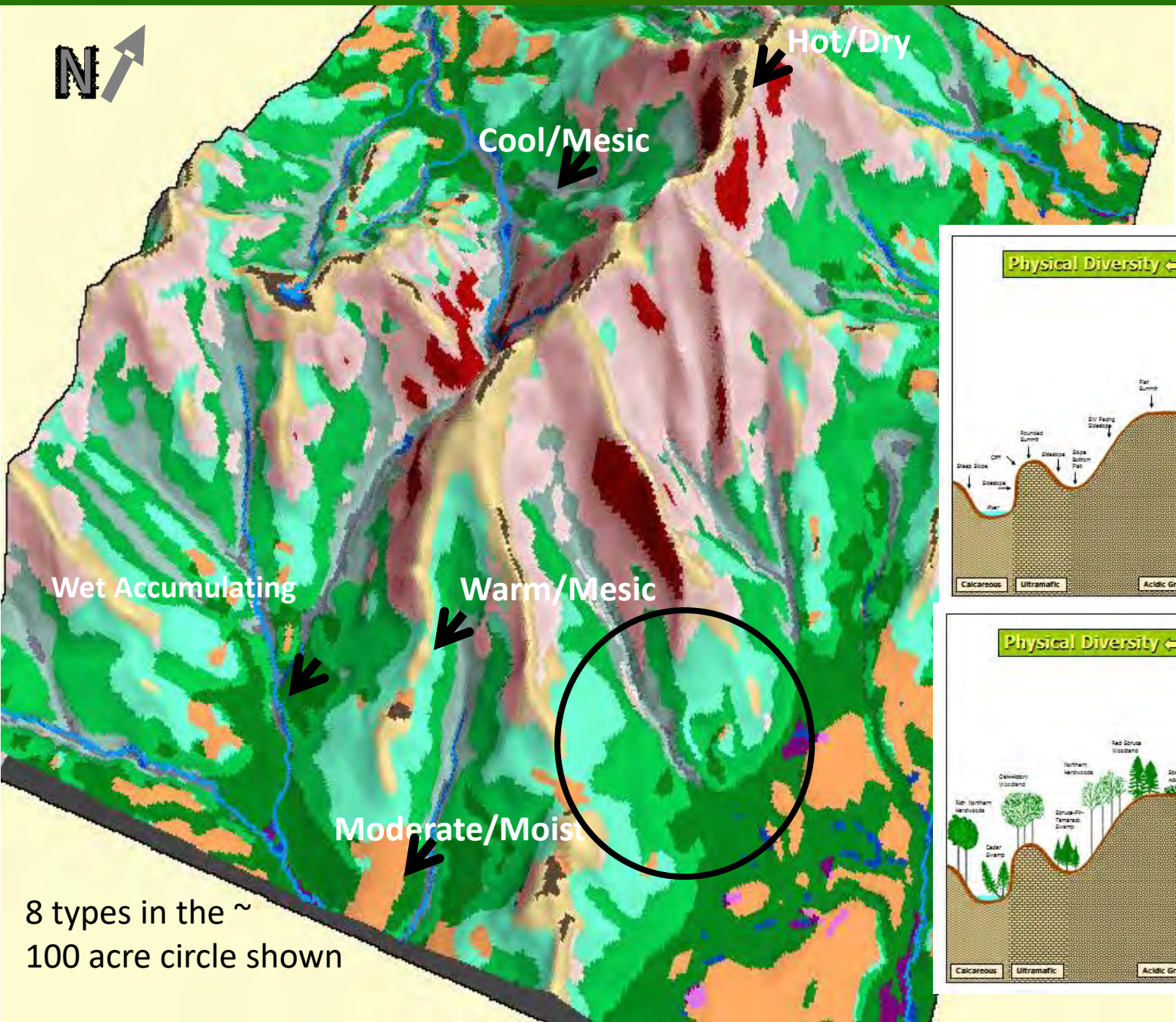




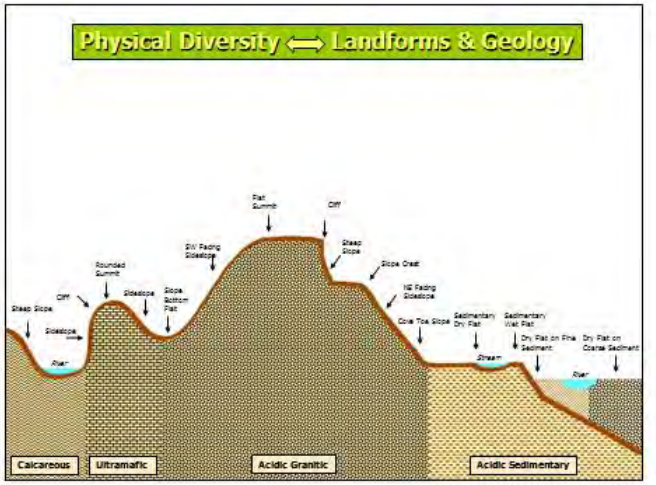


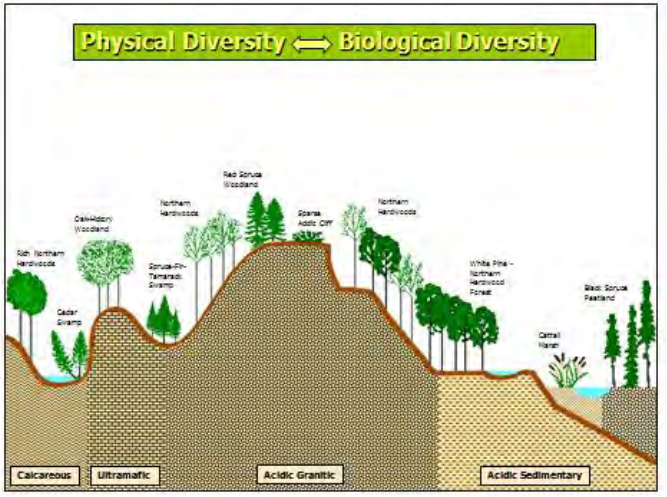
Thank You NHP!

Estimating Microclimates: 11 topo-climatic environments



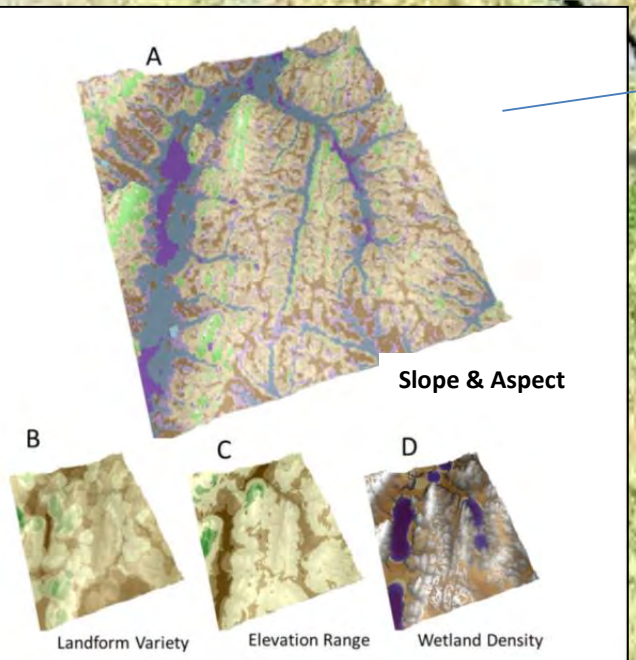
8 types in the ~
100 acre circle shown





Landscape Diversity – Microclimates

By Ecoregion



nature climate change

LETTERS

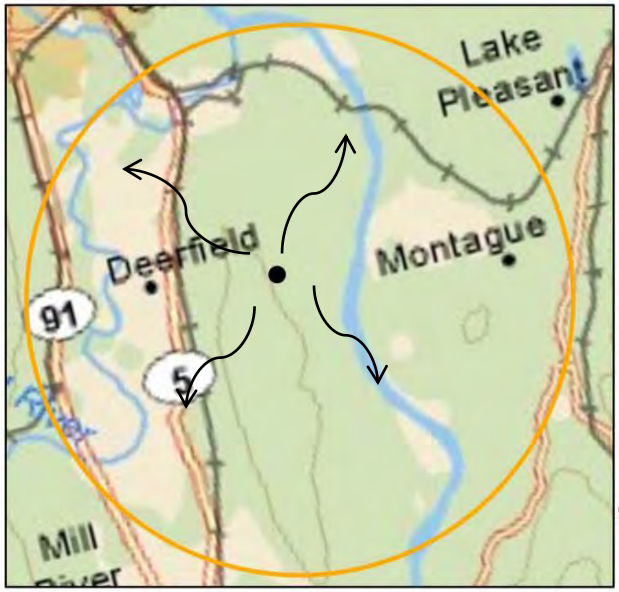
https://doi.org/10.1038/s41558-018-0231-9

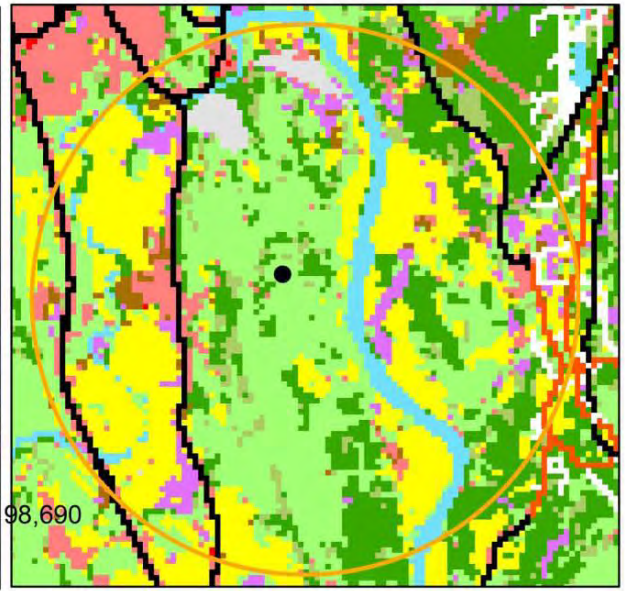
Extinction risk from climate change is reduced by microclimatic buffering

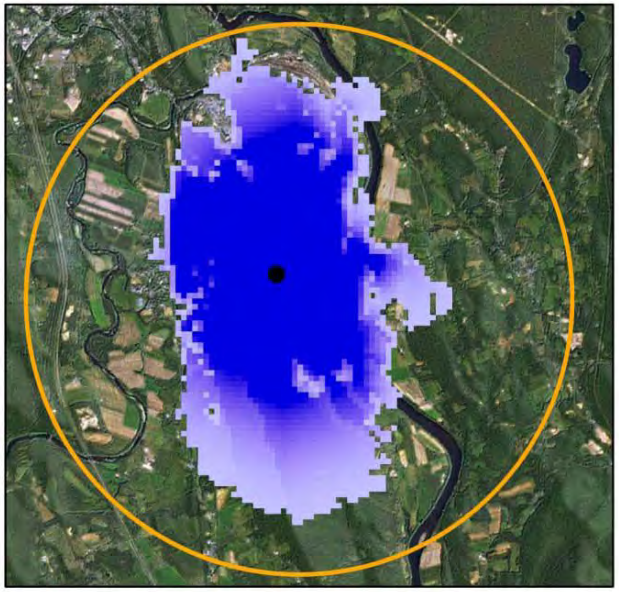
Andrew J. Suggitt[1,2*], Robert J. Wilson[3*], Nick J. B. Isaac[4], Colin M. Beale[2], Alistair G. Auffret[5,6], Tom August[4], Jonathan J. Bennie[1], Humphrey Q. P. Crick[7], Simon Duffield[7], Richard Fox[8], John J. Hopkins[1], Nicholas A. Macgregor[7,9], Mike D. Morecroft[7], Kevin J. Walker[10] and Ilya M. D. Maclean[1*]

5 million, 430 sp

Local Connectedness







Highly Permeable areas offer many options and alternatives for movement and reorganization

We used a resistant kernel model based on weights assigned to roads, development and agriculture

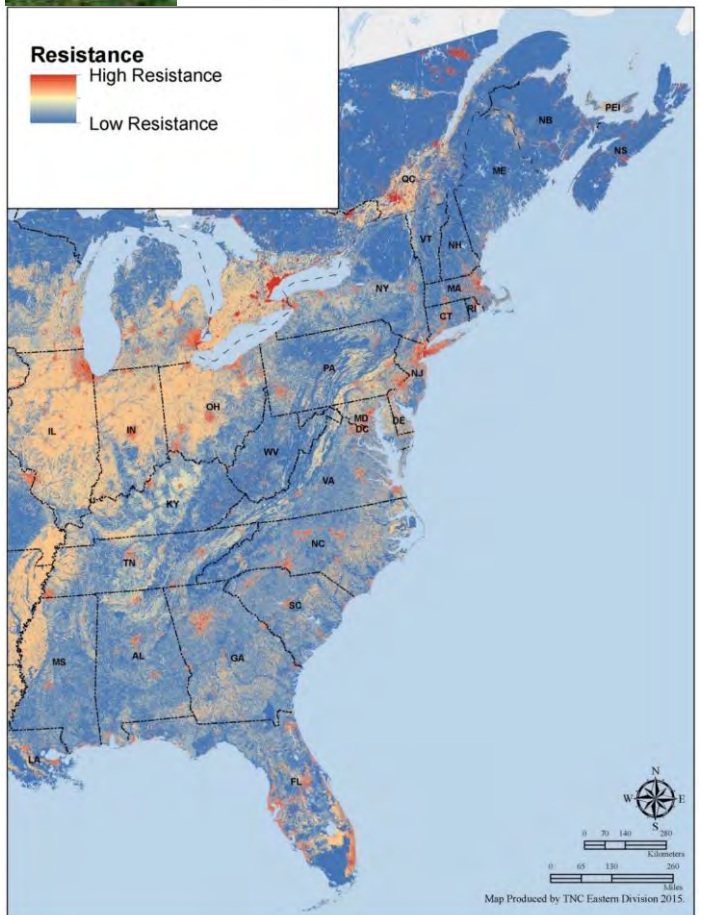
Developed by Brad Compton: UMASS

Category	Weight
Developed	
-Low intensity	8
-Mid intensity	9
-High intensity	20
-Mine	9
Roads/Linear	
-Major	20
-Minor	10
-Unpaved	+1
-Transmission	9
-Pipelines	9
-Railroads	9
Agriculture	
-Corn/Soy	9
-Other Ag	7
-Hay Pasture	3
-Forestry (indust.)	4
Energy	
-Oil & Gas	7+
-Wind	+1

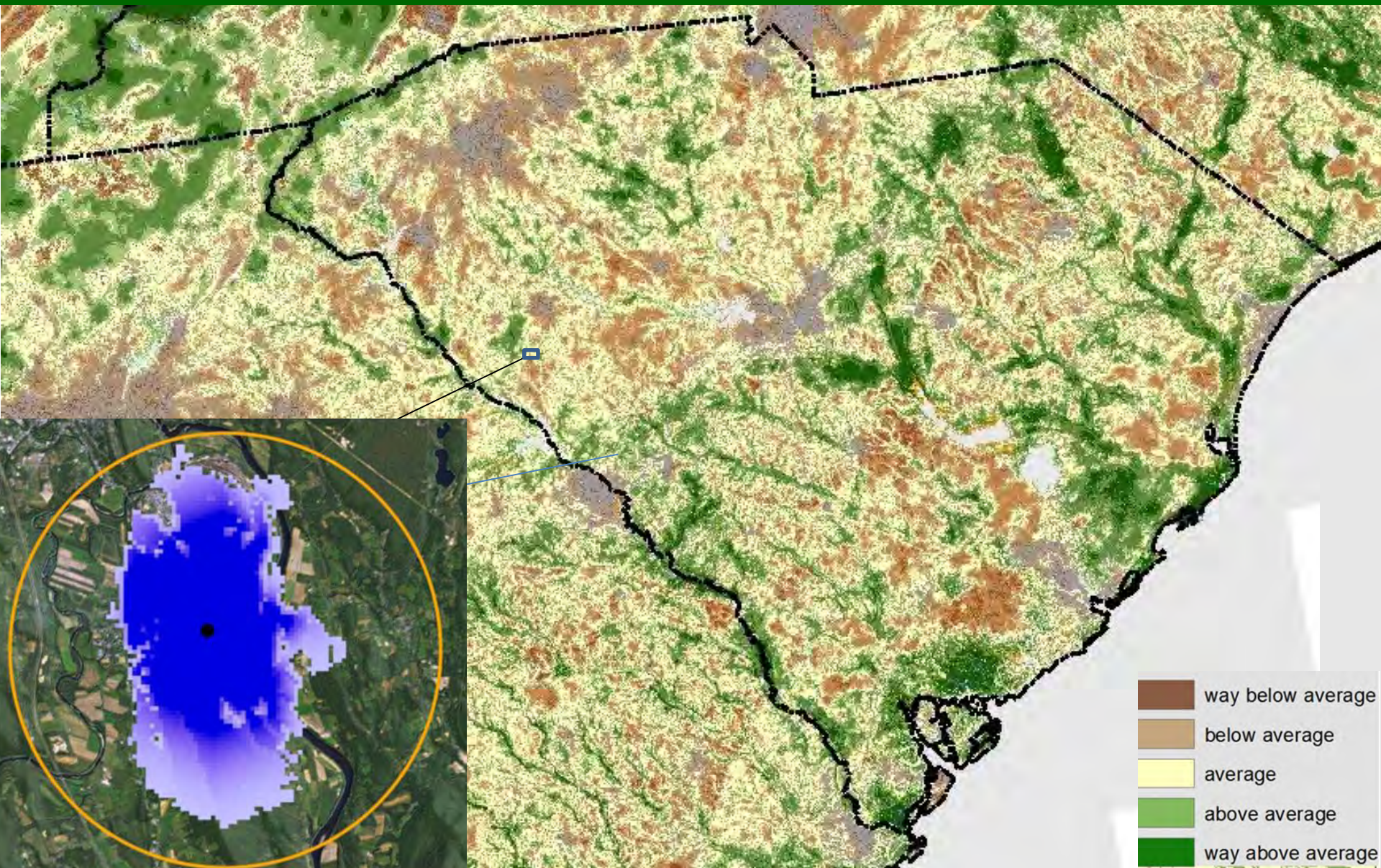
Local Connectedness

Resistance Grid

Natural	Weight
All Vegetation Types	1
Barrens	1
Water (by size)	1-3*



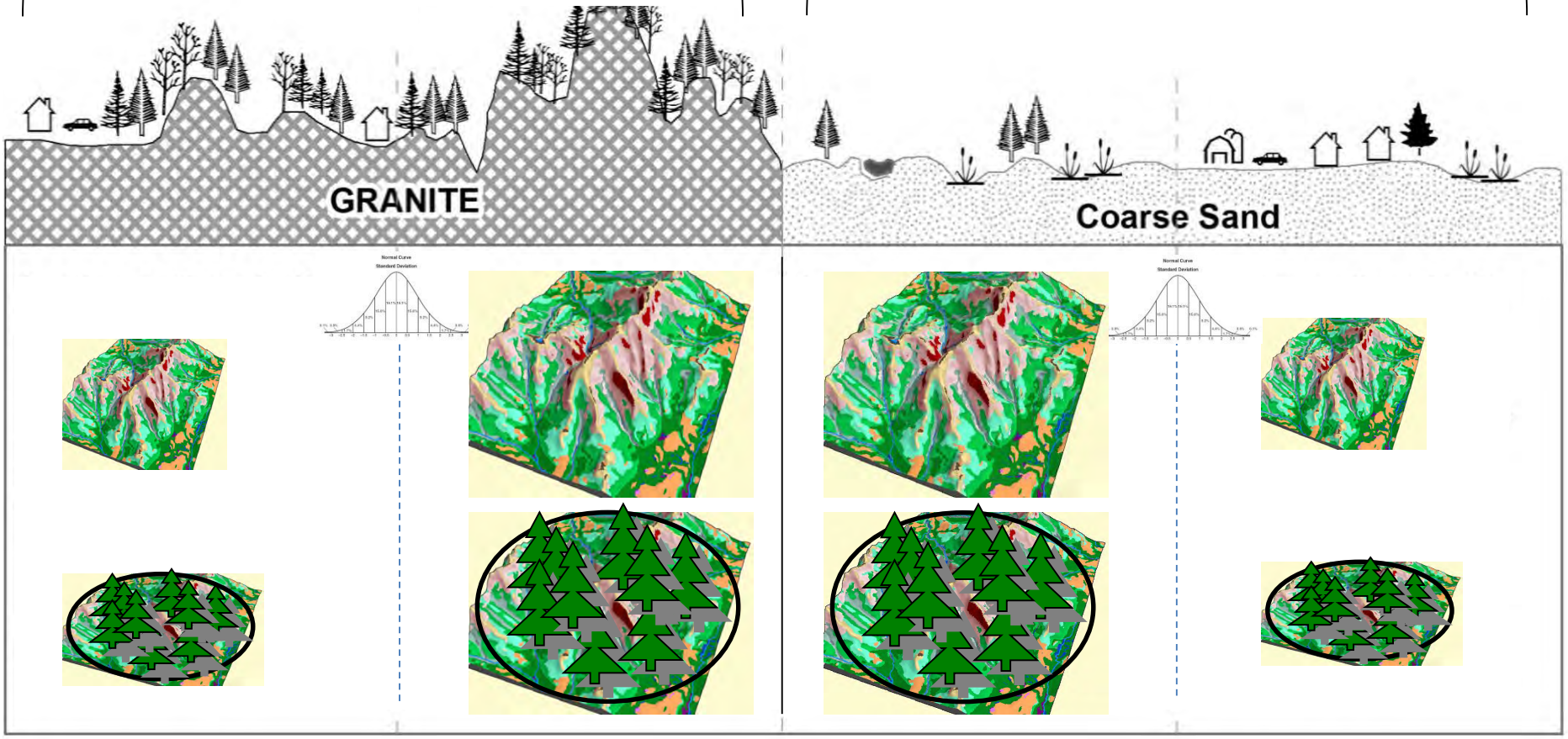
Local Connectedness
(by ecoregion)



Climatic Species Pool

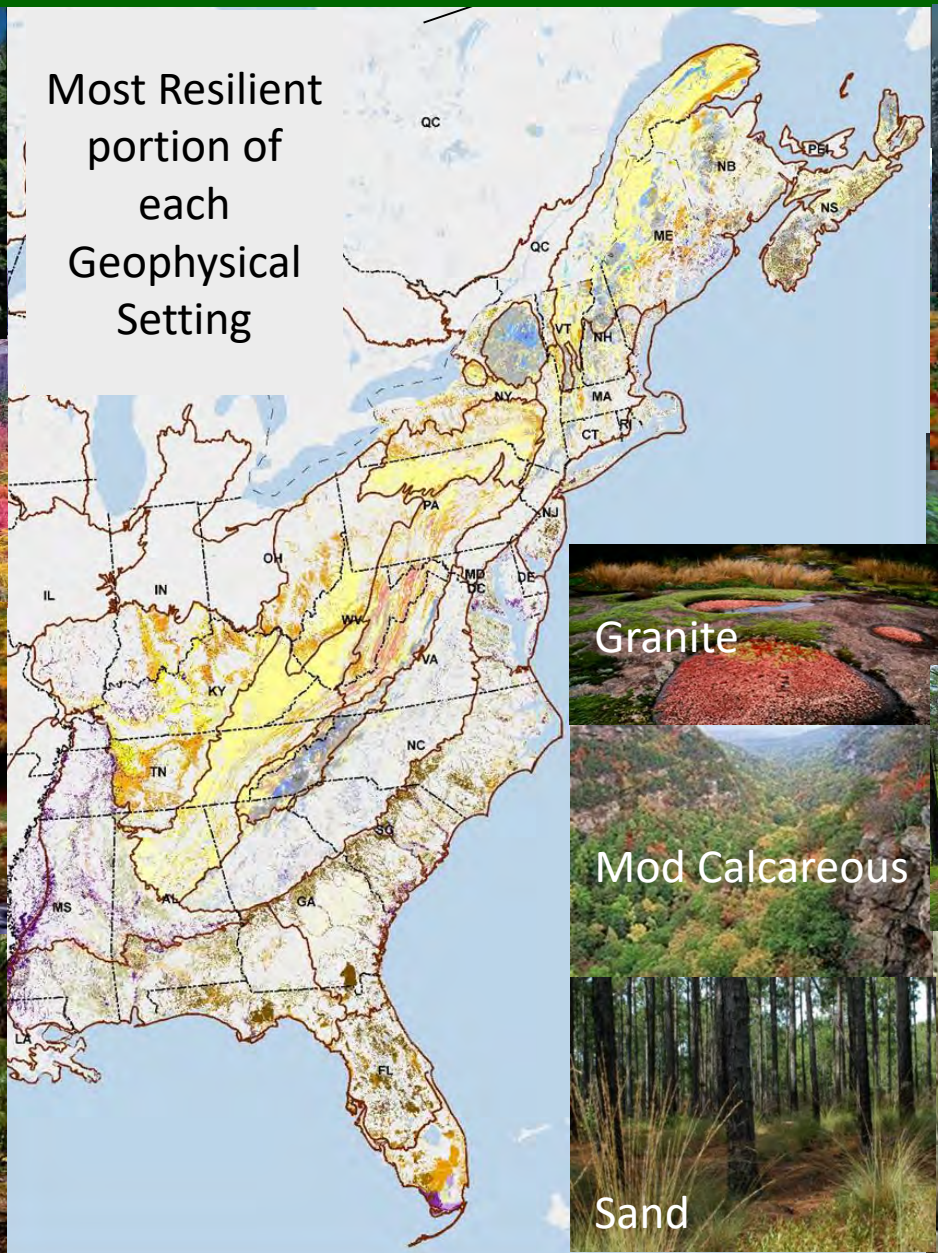
Granite to Granite

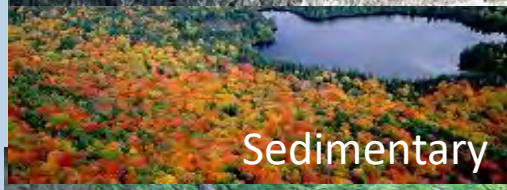
Sand to Sand

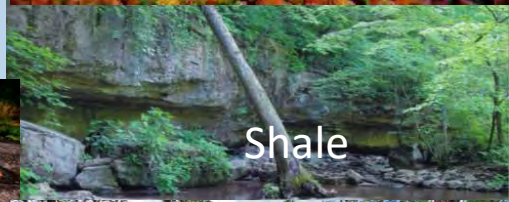


Representation & Resilience

About 33% of each Geophysical Environment in each Ecoregion

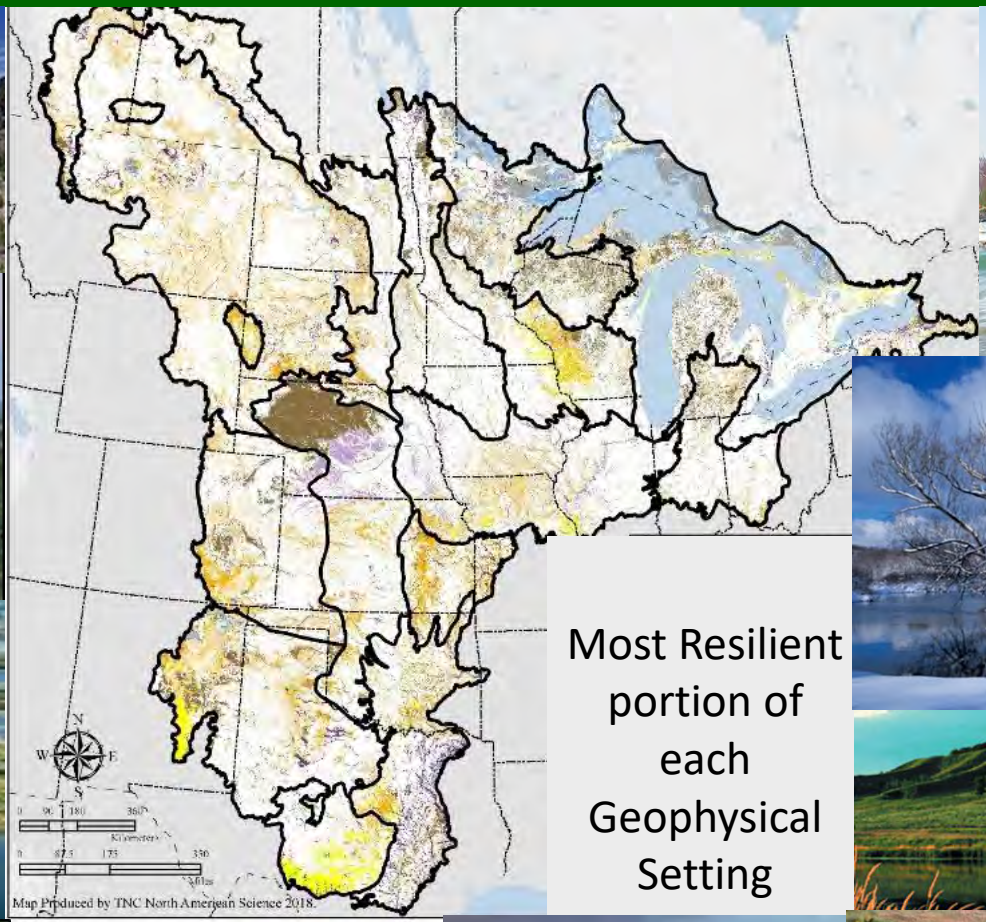






Representation & Resilience

About 33% of each Geophysical Environment in each Ecoregion



Most Resilient portion of each Geophysical Setting

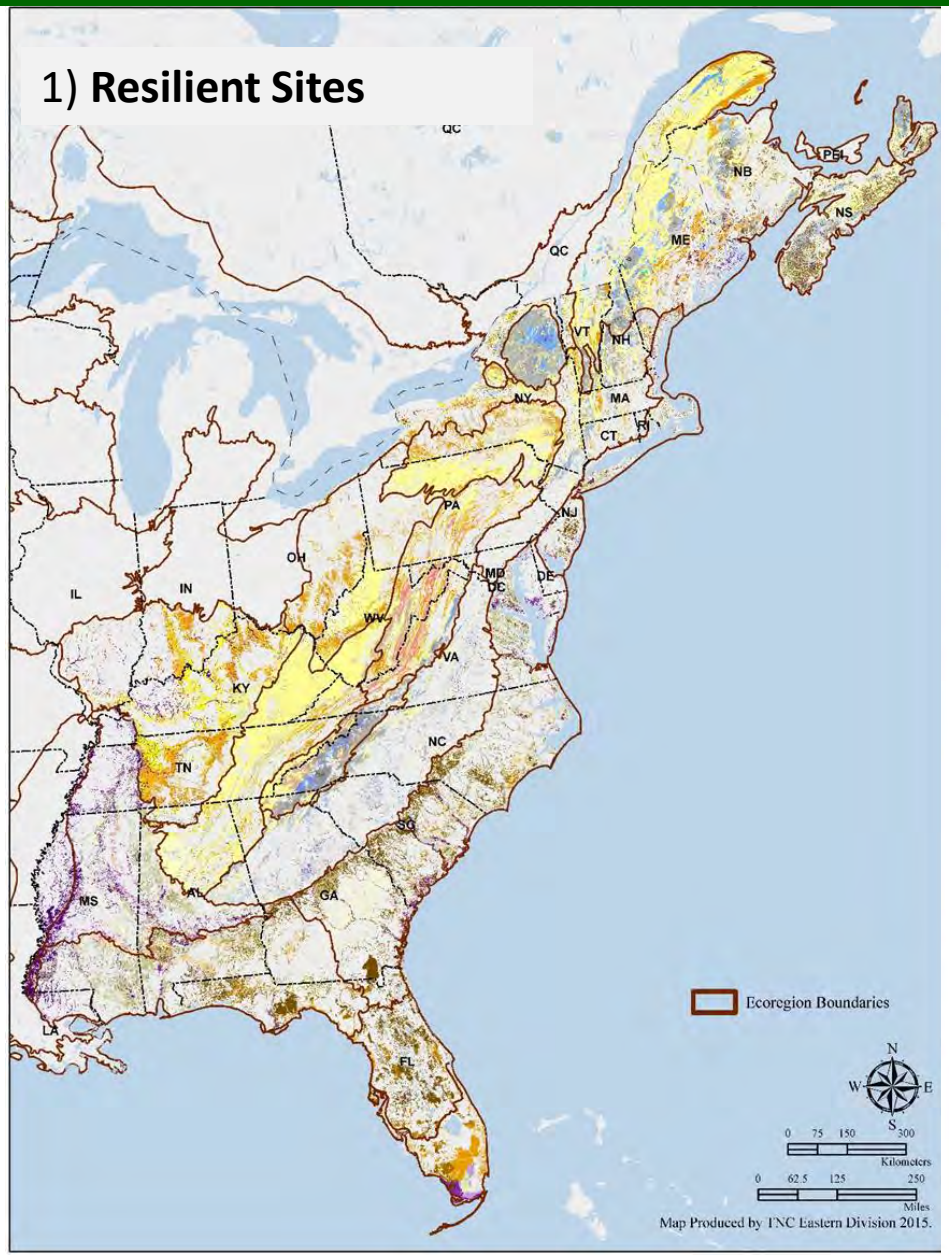
Resilient Land Map

10 years, Over 120 Scientists and Planners, Slated to be completed by July 2019

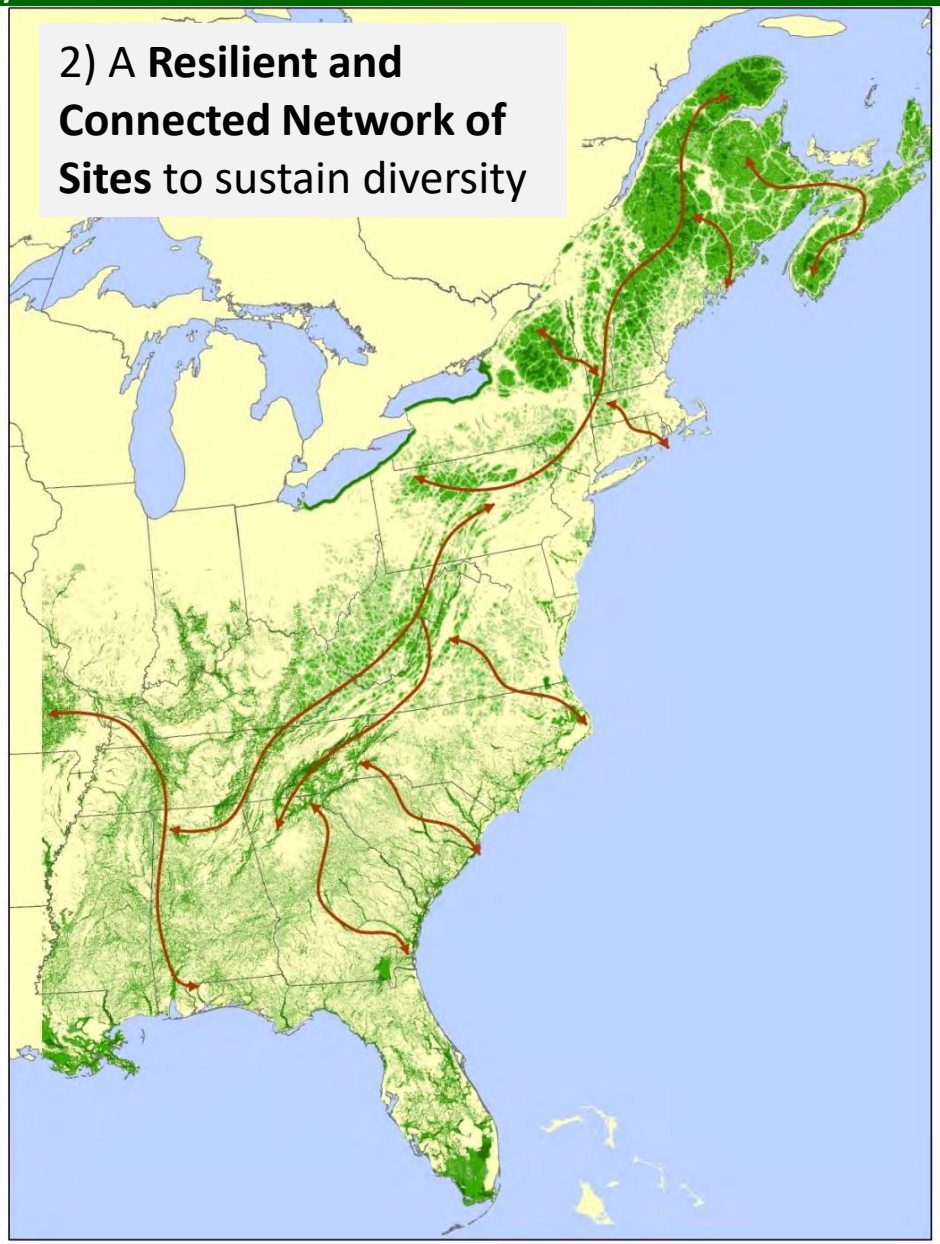
Creating a Network

Connectivity for What?

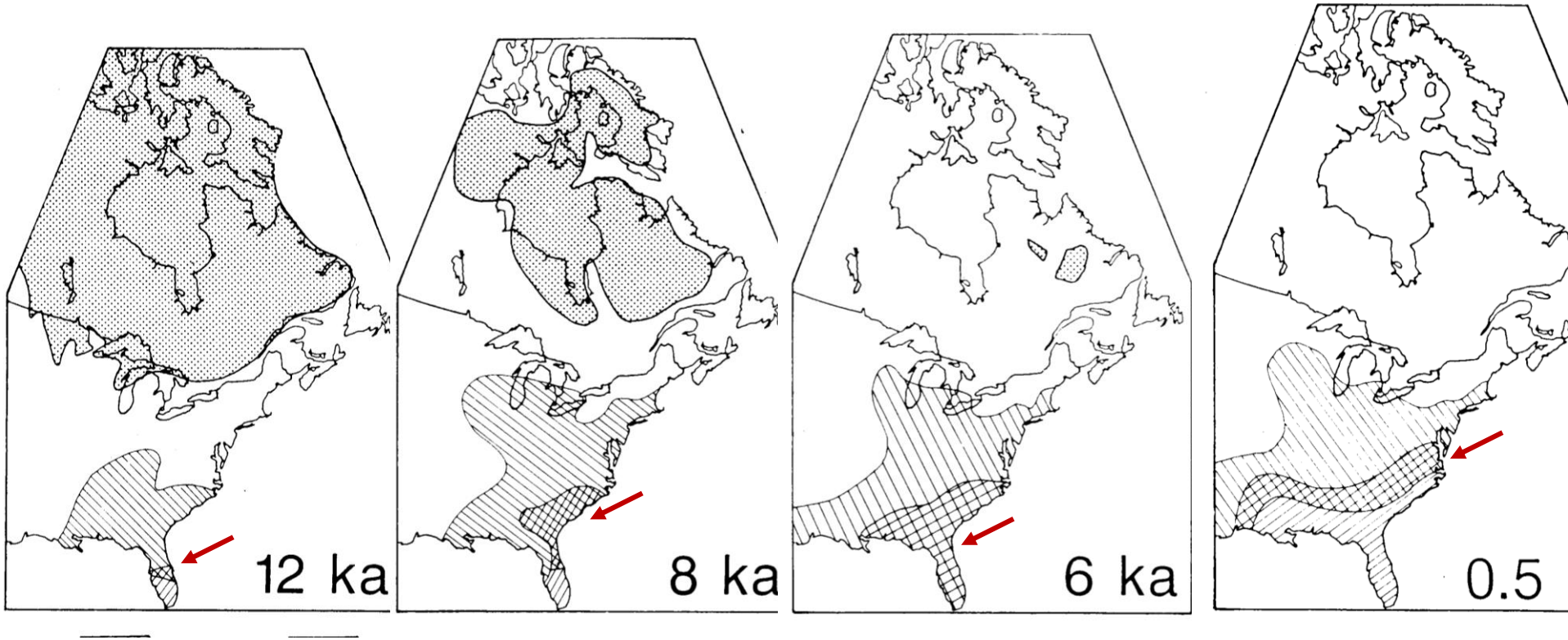
1) **Resilient Sites**



2) A **Resilient and Connected Network of Sites** to sustain diversity



Range Shifts in Response to Climate

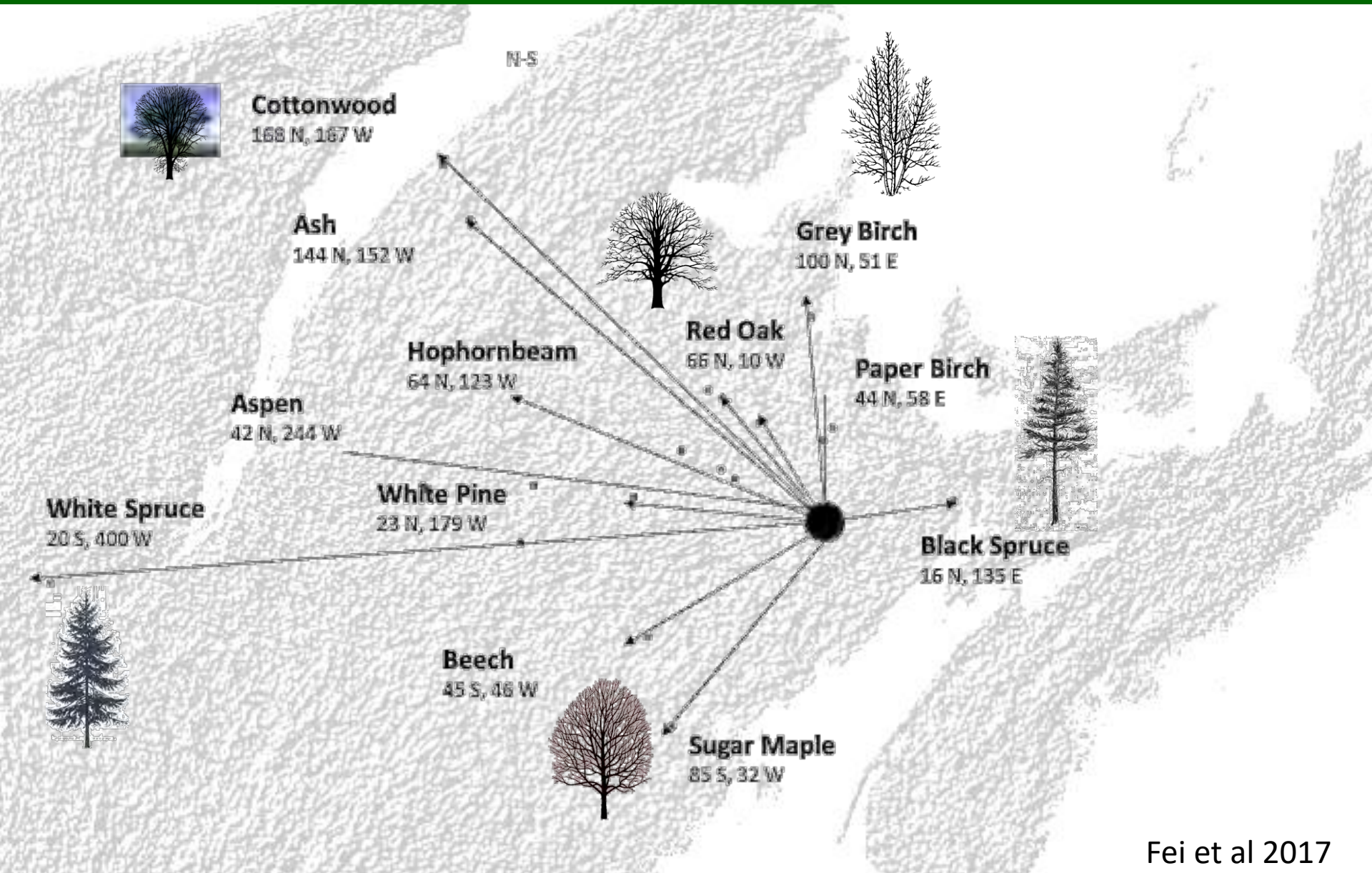


Southern Pine and Oak,
(from Hunter et al 1988)

Quaternary conundrum: "during the recent ice ages surprisingly few species became extinct." – Botkin et al. 2009

Tree Range Shifts over 40 Years

US results superimposed on Maritime Canada for Scale



Fei et al 2017

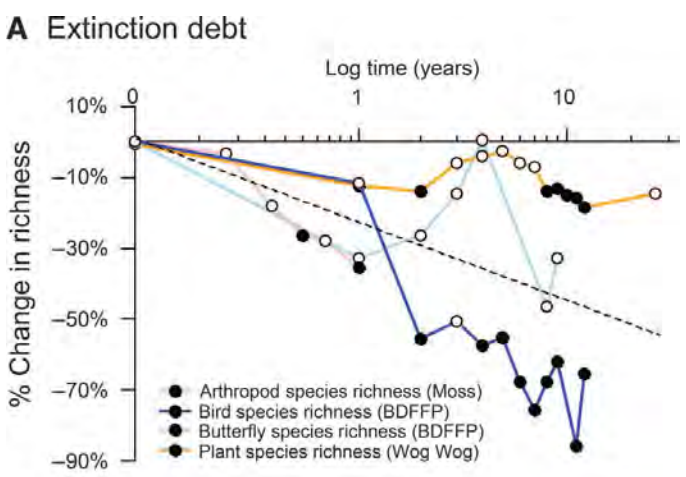
The Bad News

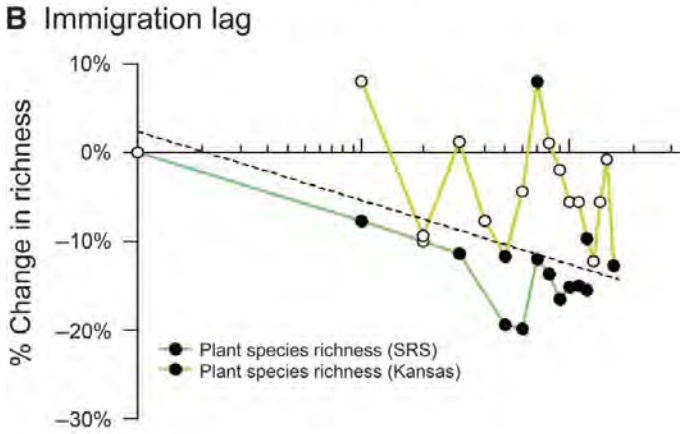
Not the same landscape

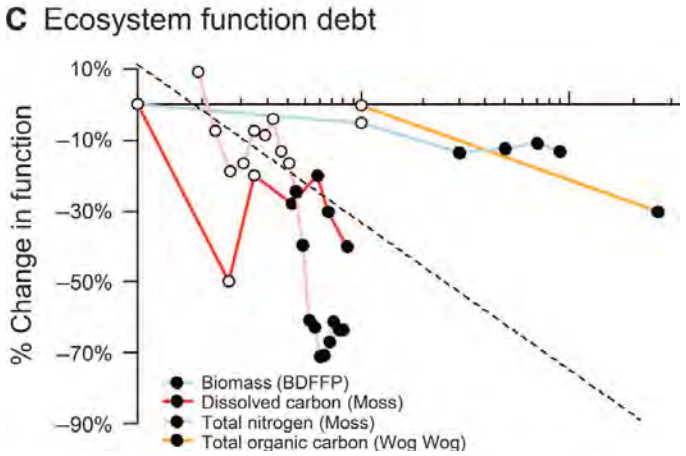
3 M miles road
144 M people

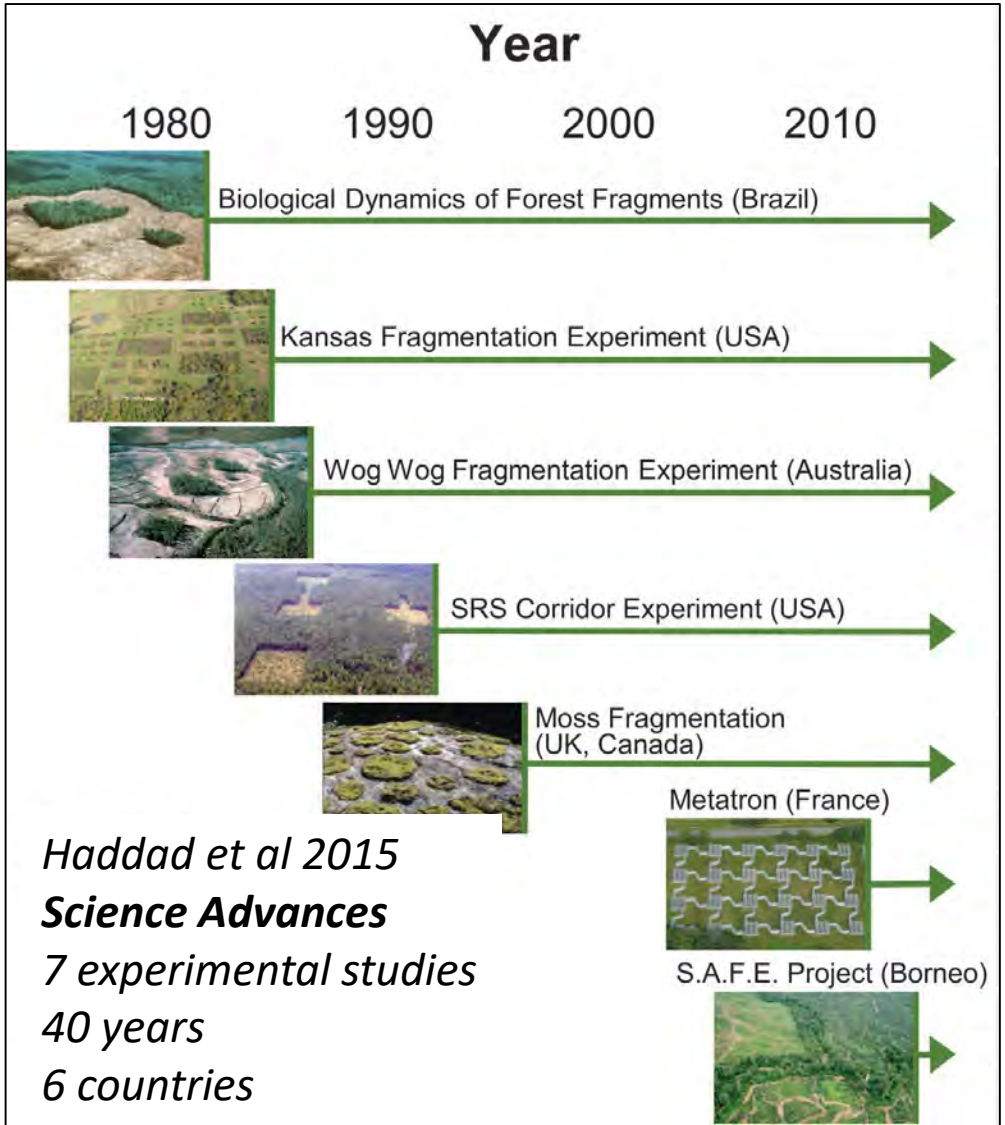
Effects of Fragmentation

Strong, Consistent, and Accumulating









Haddad et al 2015

Science Advances

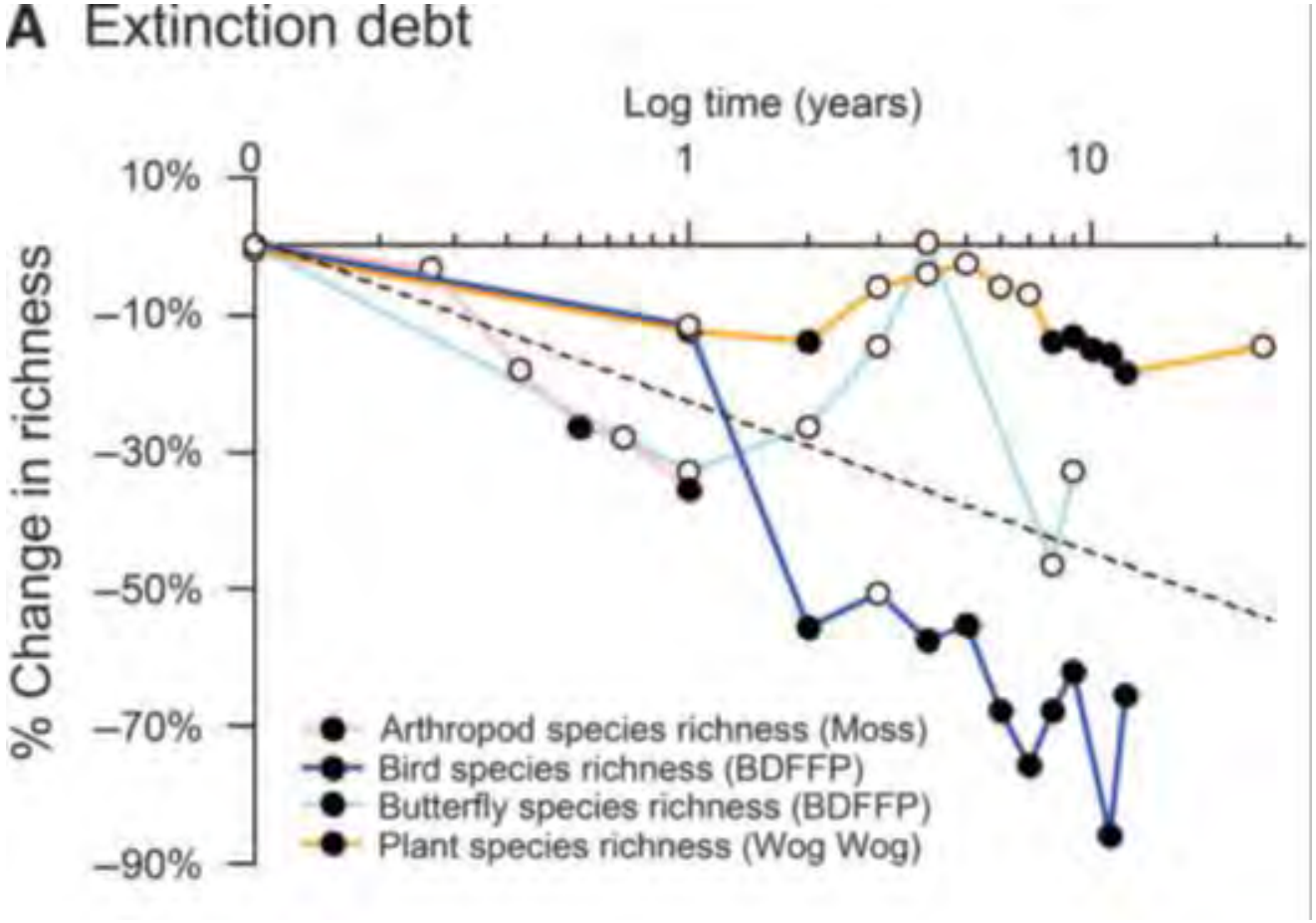
7 experimental studies

40 years

6 countries

Species

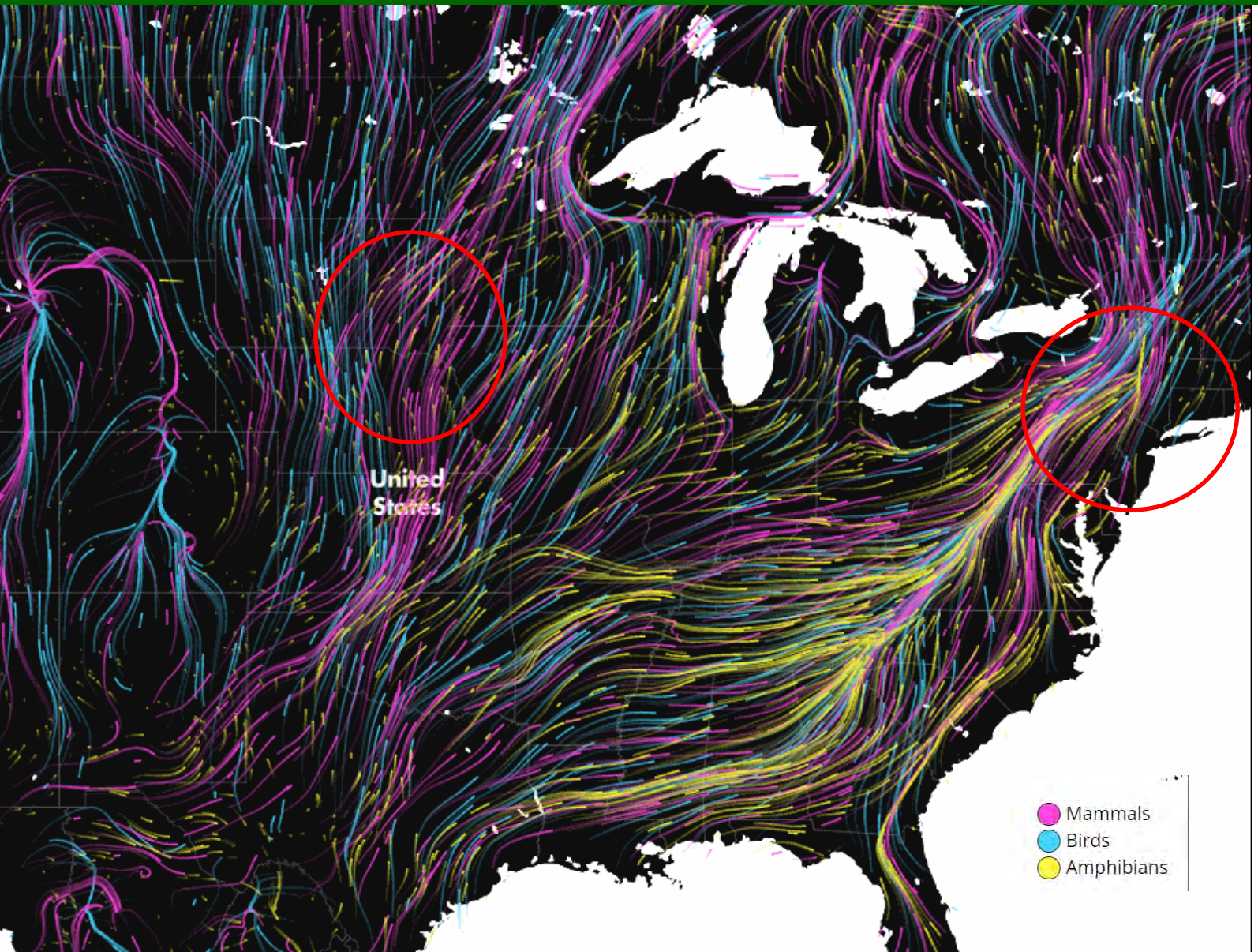
Variation around the Decline



Reversibility

Migrations in Motion

Natural Flow Patterns



The gradual movement of populations across the landscape in response to climate change

Current Rates
11 mile per decade North

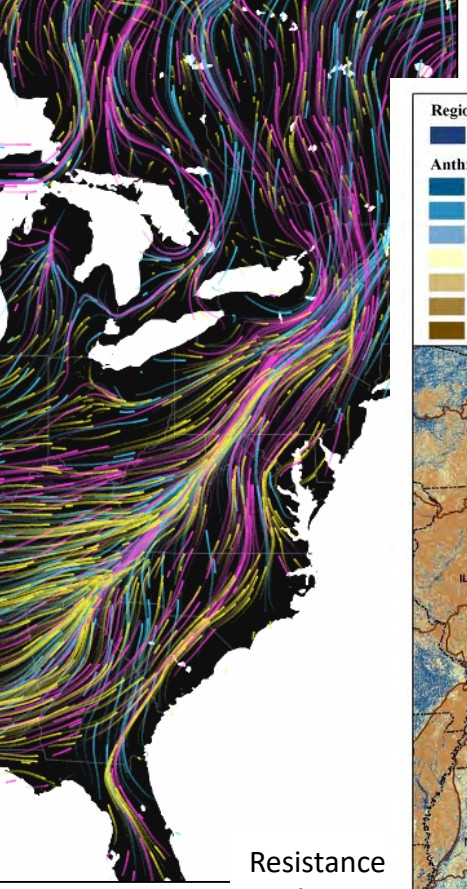
36 feet per decade Upslope

Lawler et al 2015. Animation thanks to Dan Majka

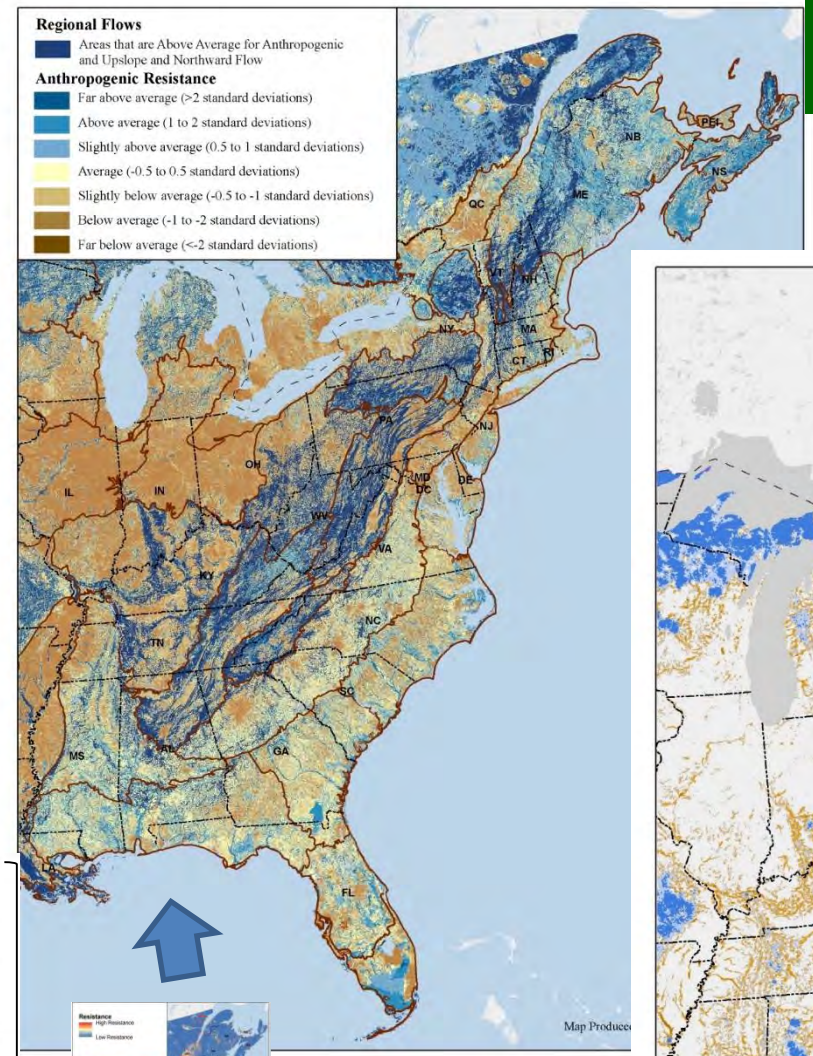
Climate Flow

(wall to wall Circuitscape)

Thanks to
Brad McRae

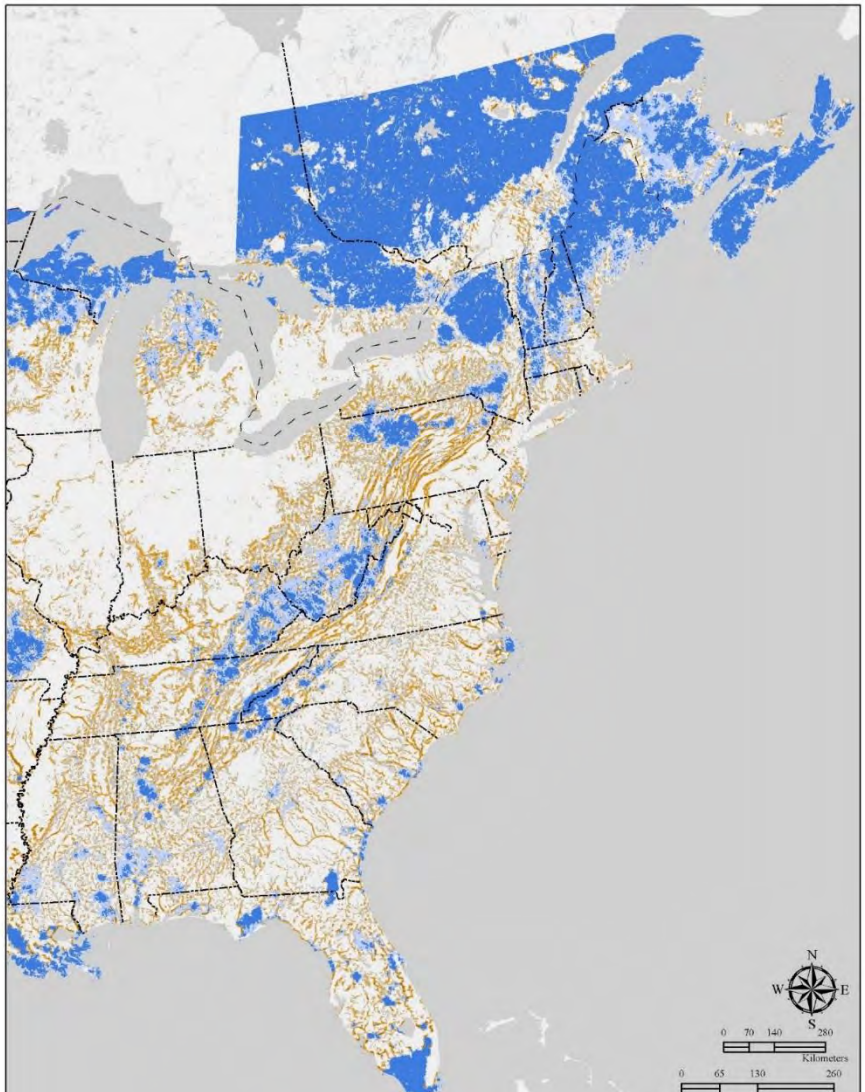


Resistance Grid

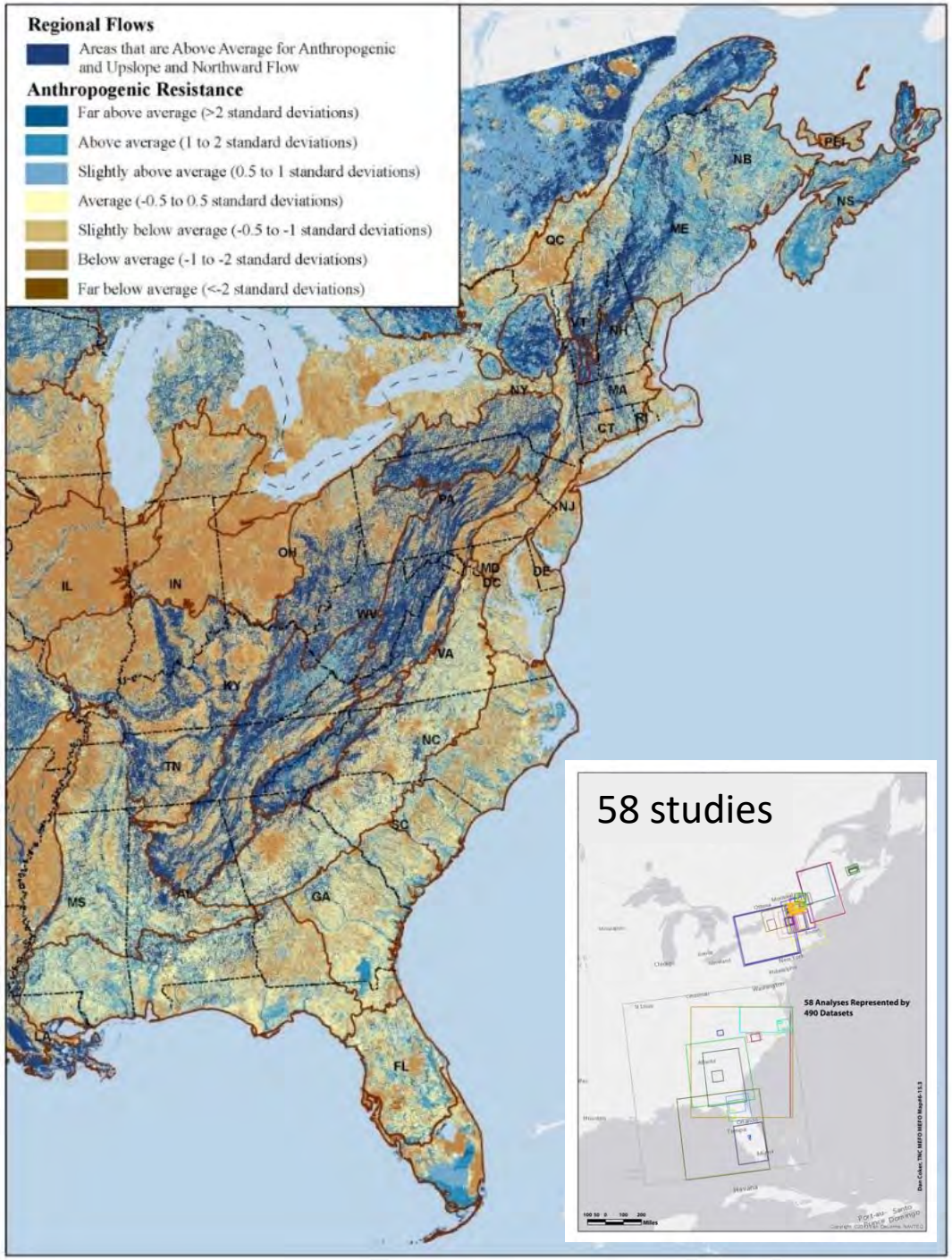


Category	Weight
Developed	
-Low intensity	8
-Mid intensity	9
-High intensity	20
-Mine	9
Roads/Linear	
-Major	20
-Minor	10
-Unpaved	+1
-Transmission	9
-Pipelines	9
-Railroads	9
Agriculture	
-Corn/Soy	9
-Other Ag	7
-Hay Pasture	3
-Forestry (indust.)	4
Energy	
-Oil & Gas	7+
-Wind	+1

Based on same Resistance Grid as Local Connectedness

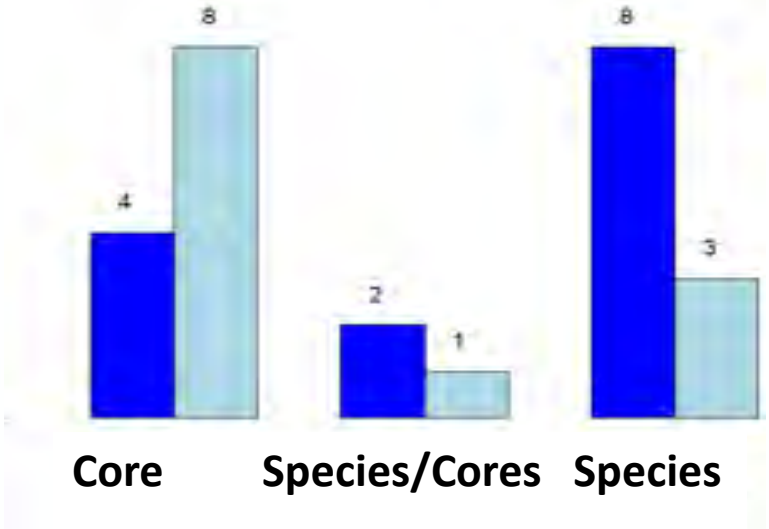


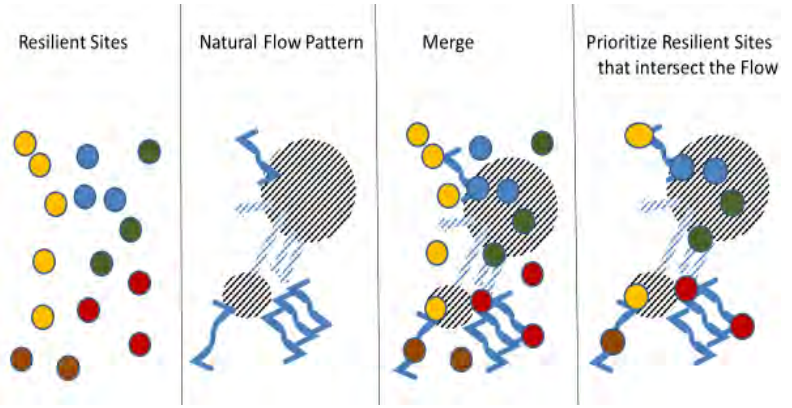
Testing the Flow Data



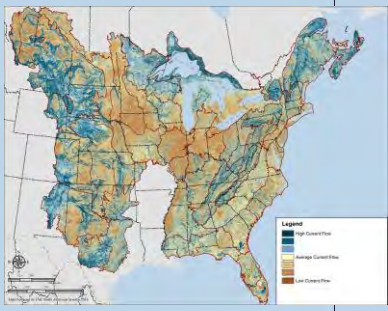
Good Agreement

Moderate Agreement





Resilience and Flow



Legend

High Resilience & High Flow Land

Score above 1000

High Resilient Land

Areas of Above Average Resilience

Go with the flow!

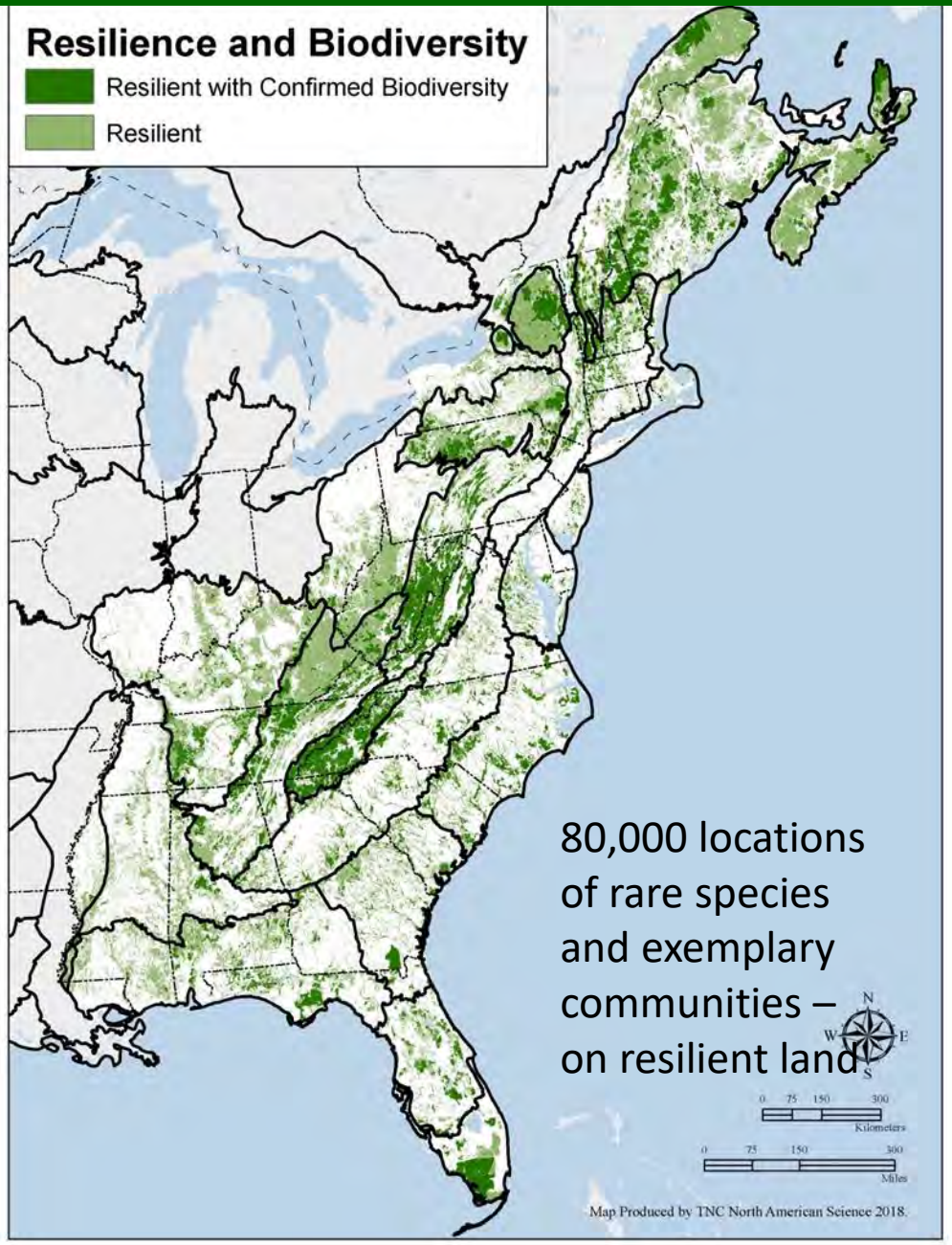
N
W E
S

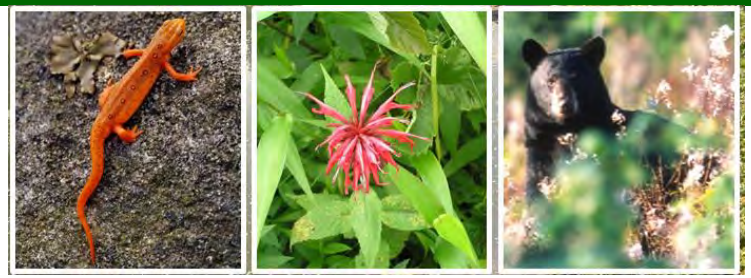
0 125 250 500
Kilometers

0 125 250 500
Miles

Map Produced by TNC North American Science 2019.

Confirmed Biodiversity: Dispersal Pressure

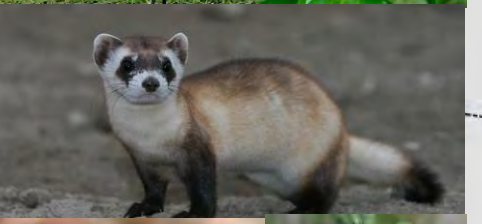


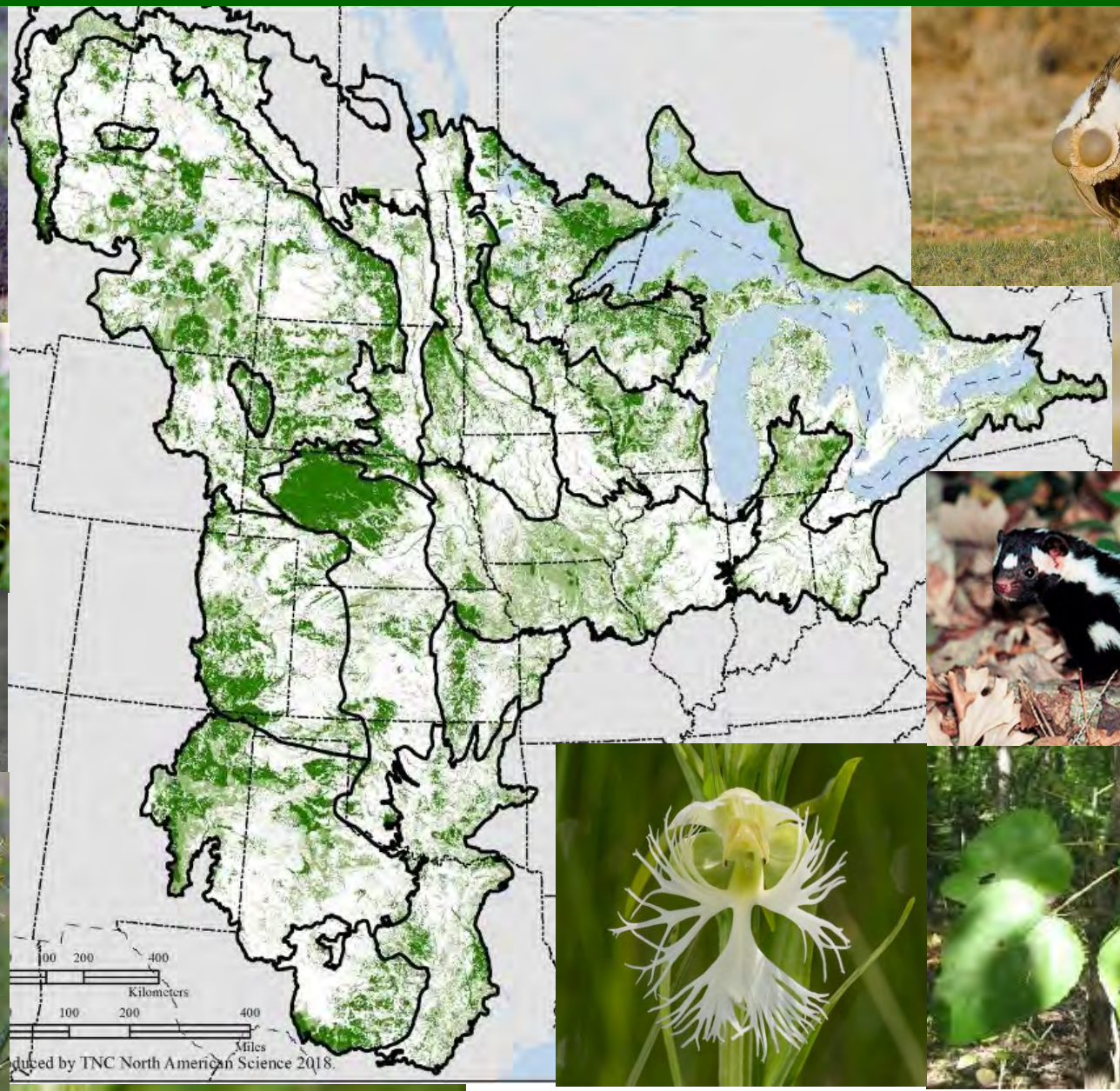


Rare species and exemplary example of unique communities ensure that the network is seeded with robust populations providing the raw material for change and adaptation.

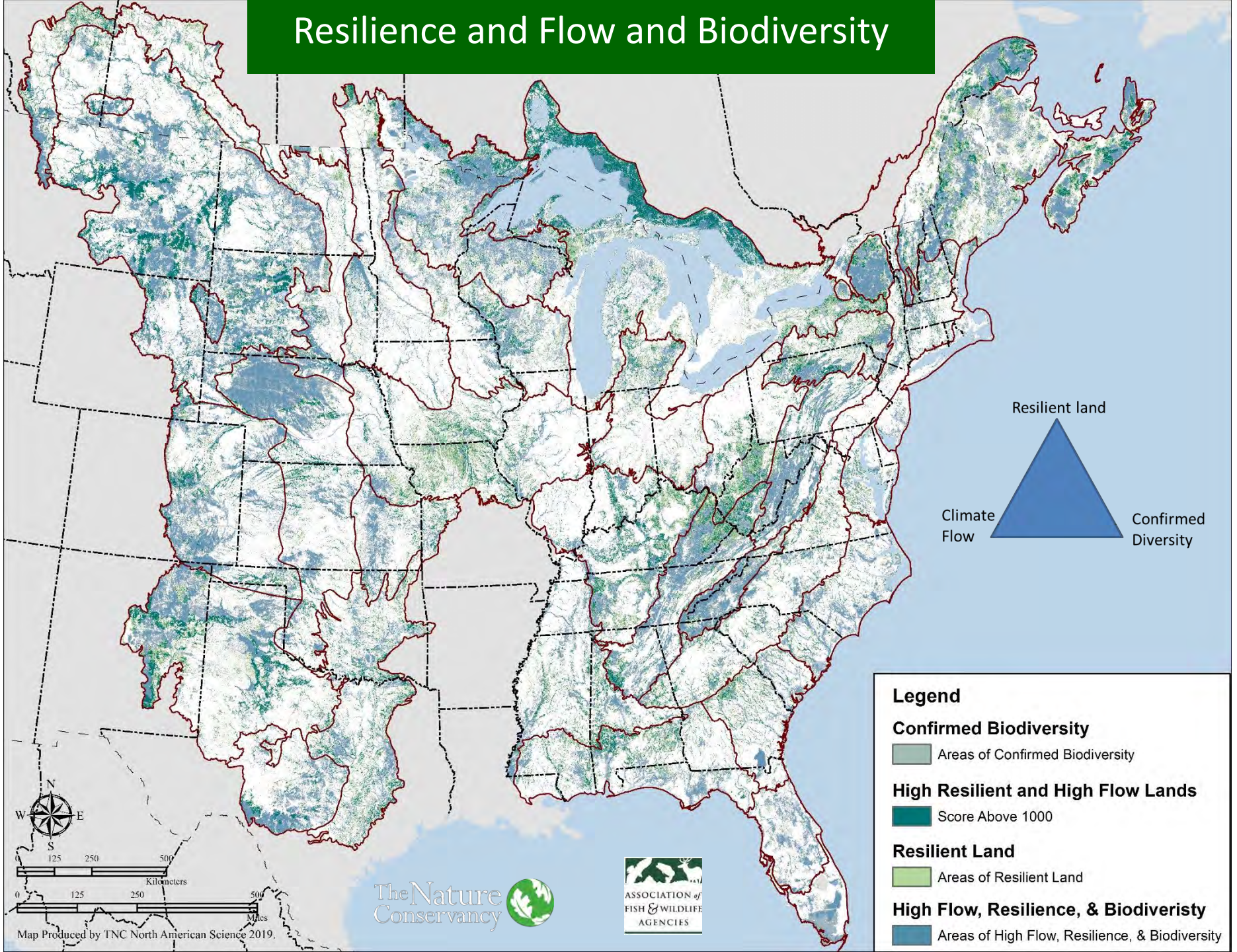
Confirmed Biodiversity

TNC Portfolio, State Wildlife Action Plans, Rare Species and Communities (50% of Resilince)

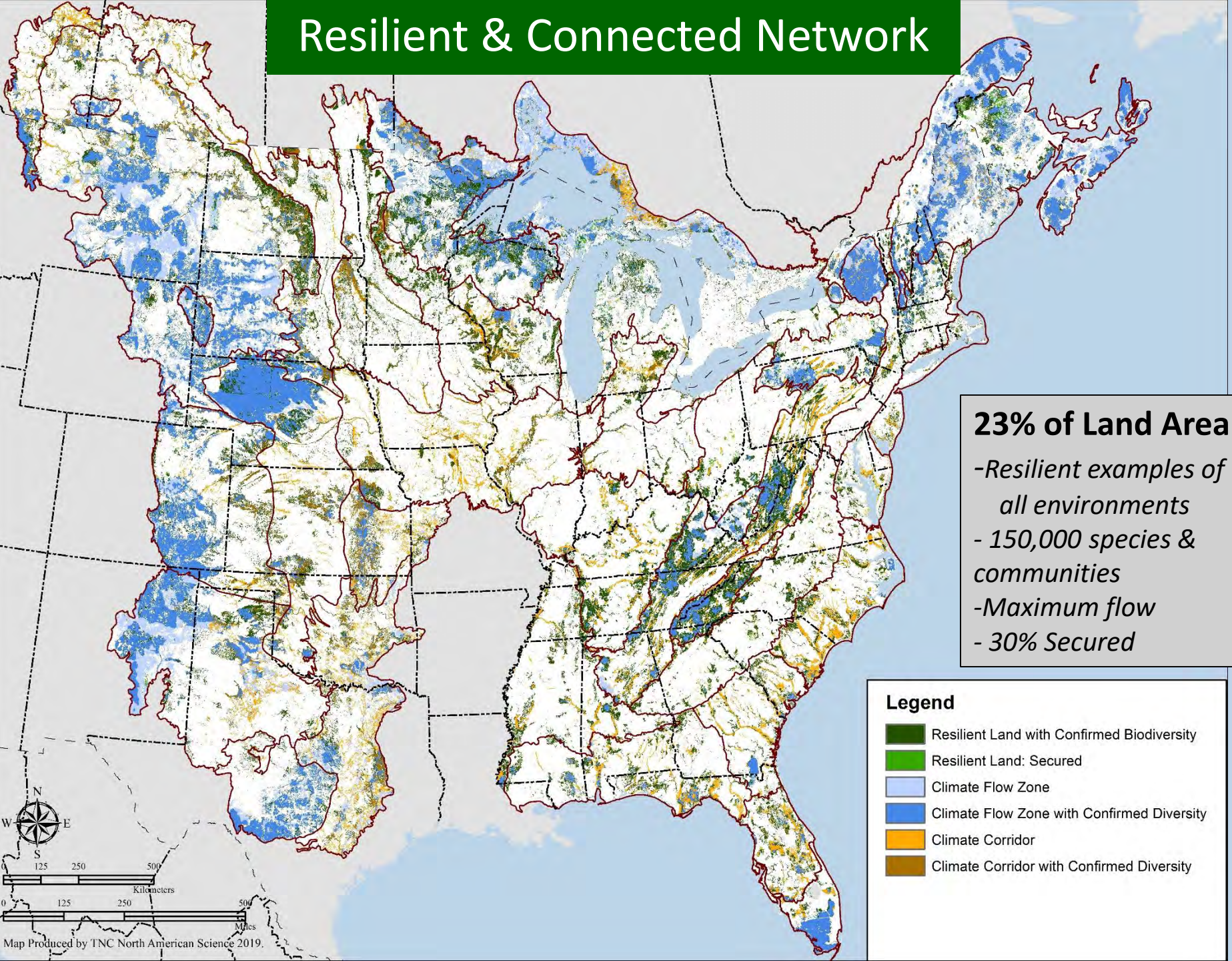




Resilience and Flow and Biodiversity

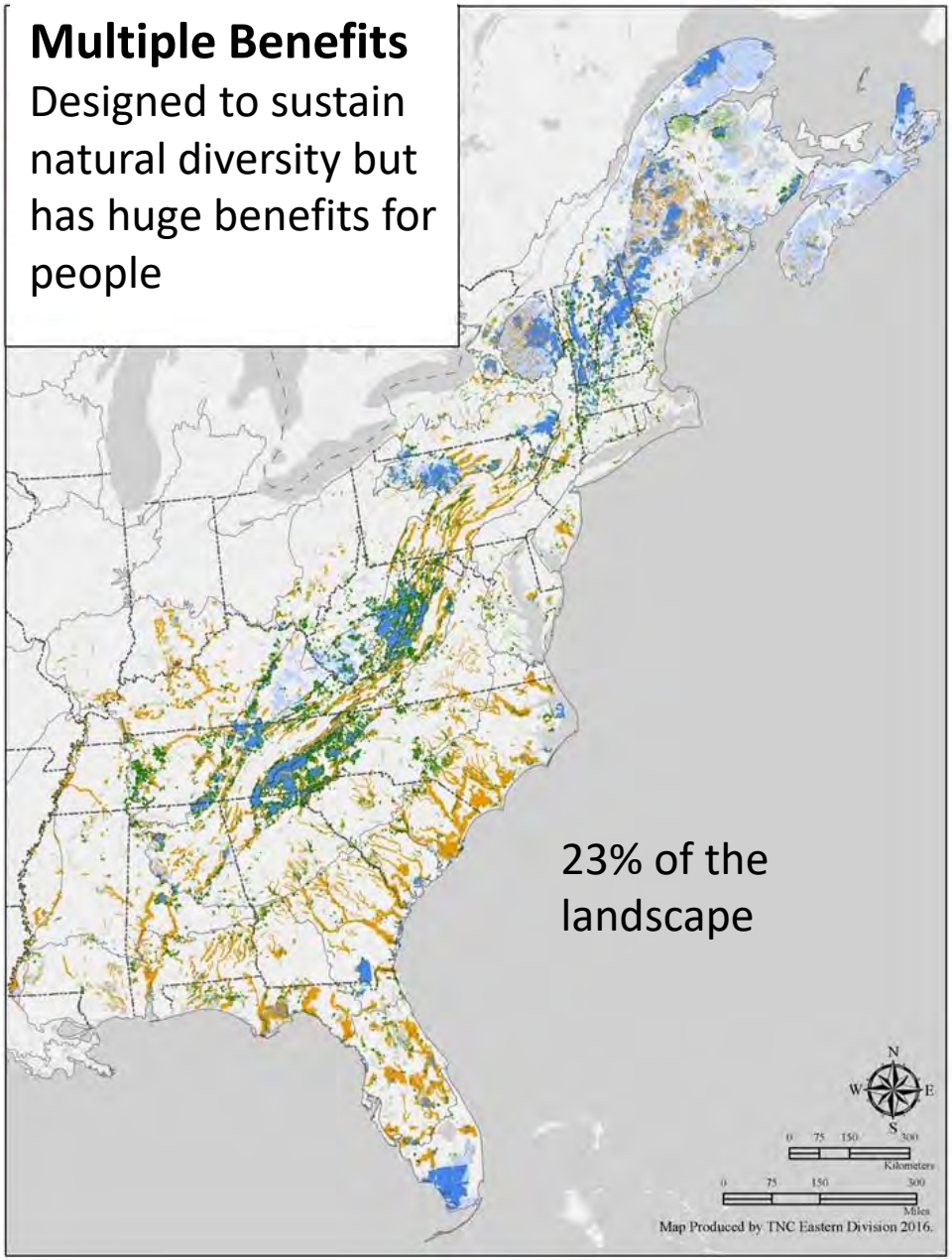


Resilient & Connected Network



Multiple Benefits

Multiple Benefits
Designed to sustain natural diversity but has huge benefits for people



56% of all **Above-Ground Carbon** (3.9 B tons)

75% of **High Value Source Water** (66+ M acres)

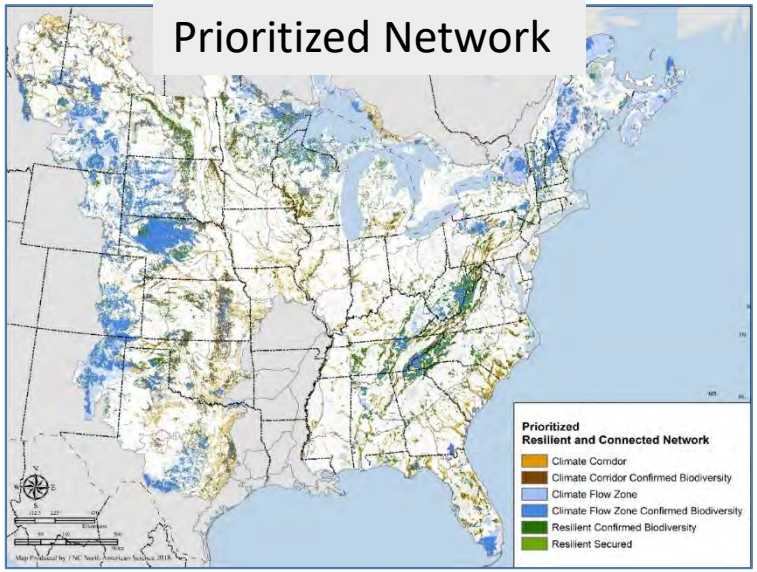
O2 for **1.8 Billion People**

Mitigates 1.3 M Tons of Pollution ($913 M)

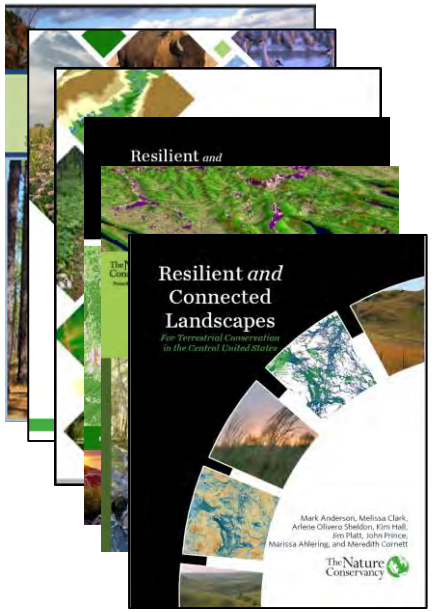
Generates ~$25 Billion - Recreation

Resources: Conservation Gateway

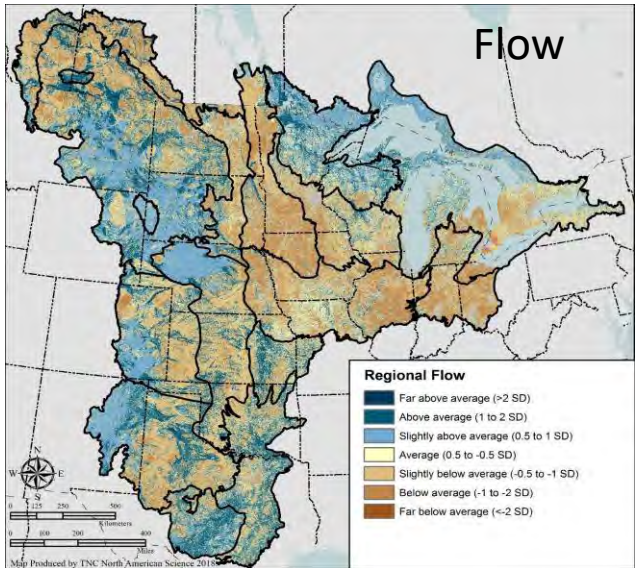
Web Tools and Story Maps



Papers and Reports

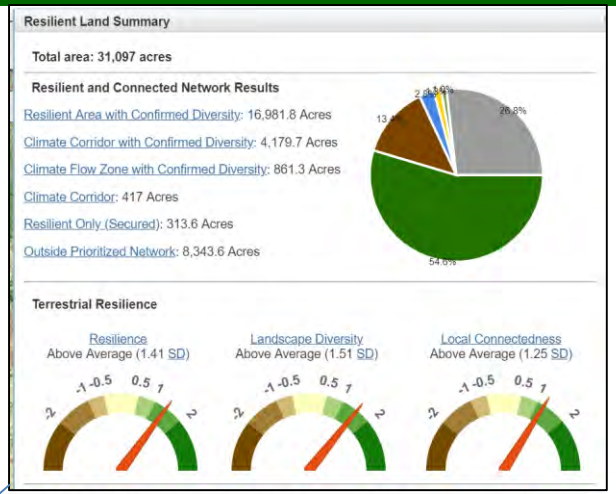


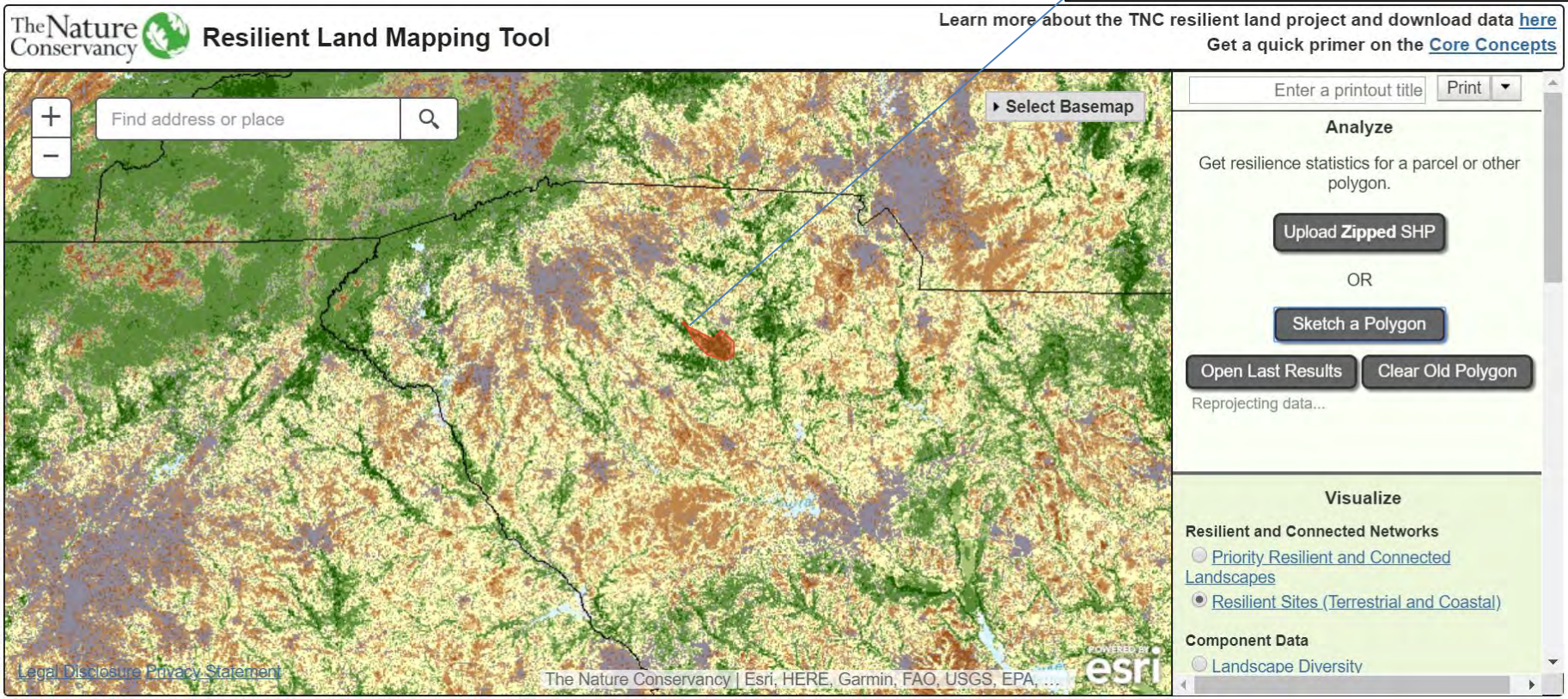
Continuous Datasets:



Resilient Land Tool

Over 12,000 visits in the last 6 months





Thank You! This work was funded by the Doris Duke Charitable Foundation, The Gaylord and Dorothy Donnelley Foundation, The USF&W Service, NOAA and The Nature Conservancy

A brief history of ecological connectivity mapping in the region

Prof. Karen Beazley,
School for Resource and Environmental Studies
Dalhousie University

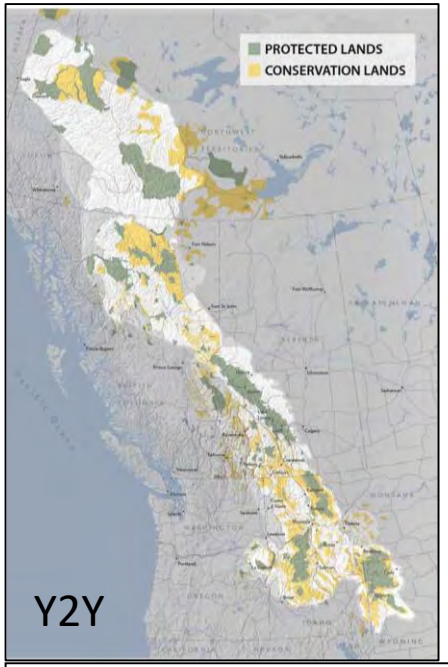
Co-chair, Canadian Maritime Ecological Connectivity Forum
Halifax, 2019

Ecological connectivity

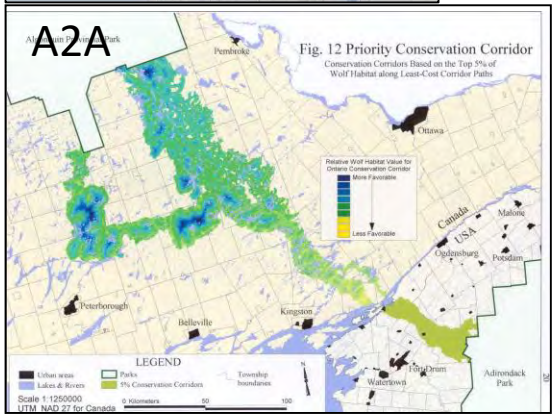
The degree to which the landscape facilitates or impedes movement or flows of species and processes across space and time.

- Landscape ecology
- Protected area networks
- Corridors and linkages

Continental ecological connectivity

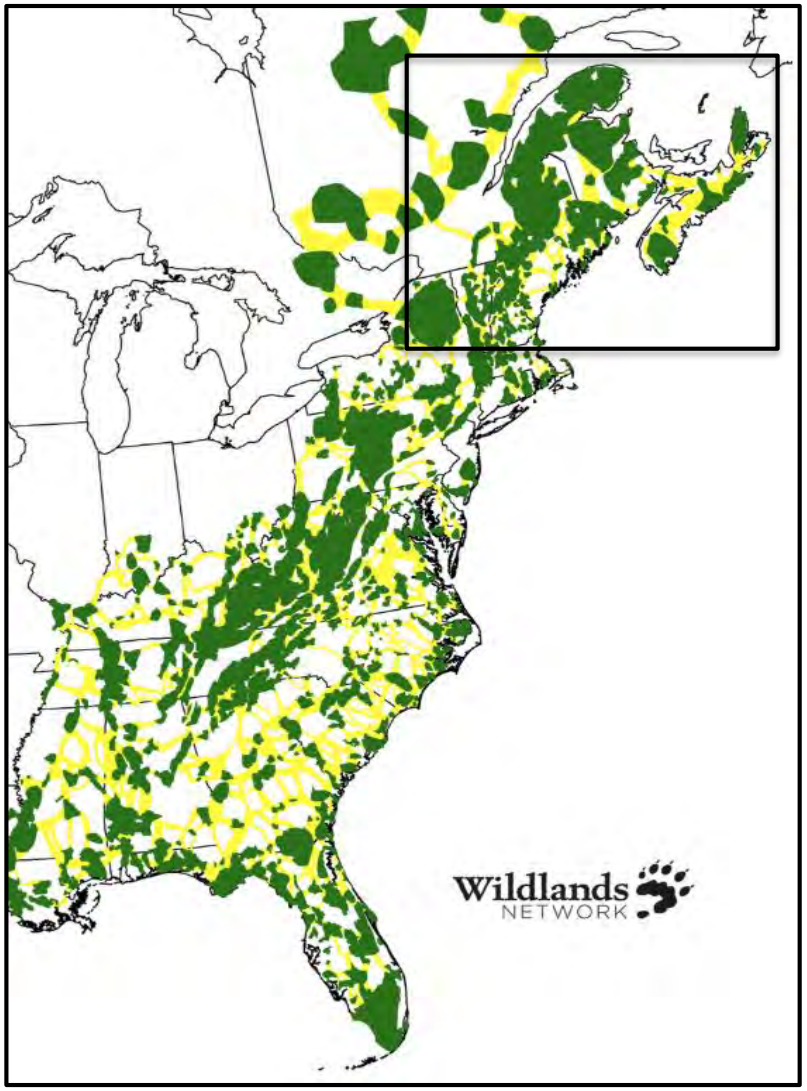


Yellowstone to Yukon (Y2Y)

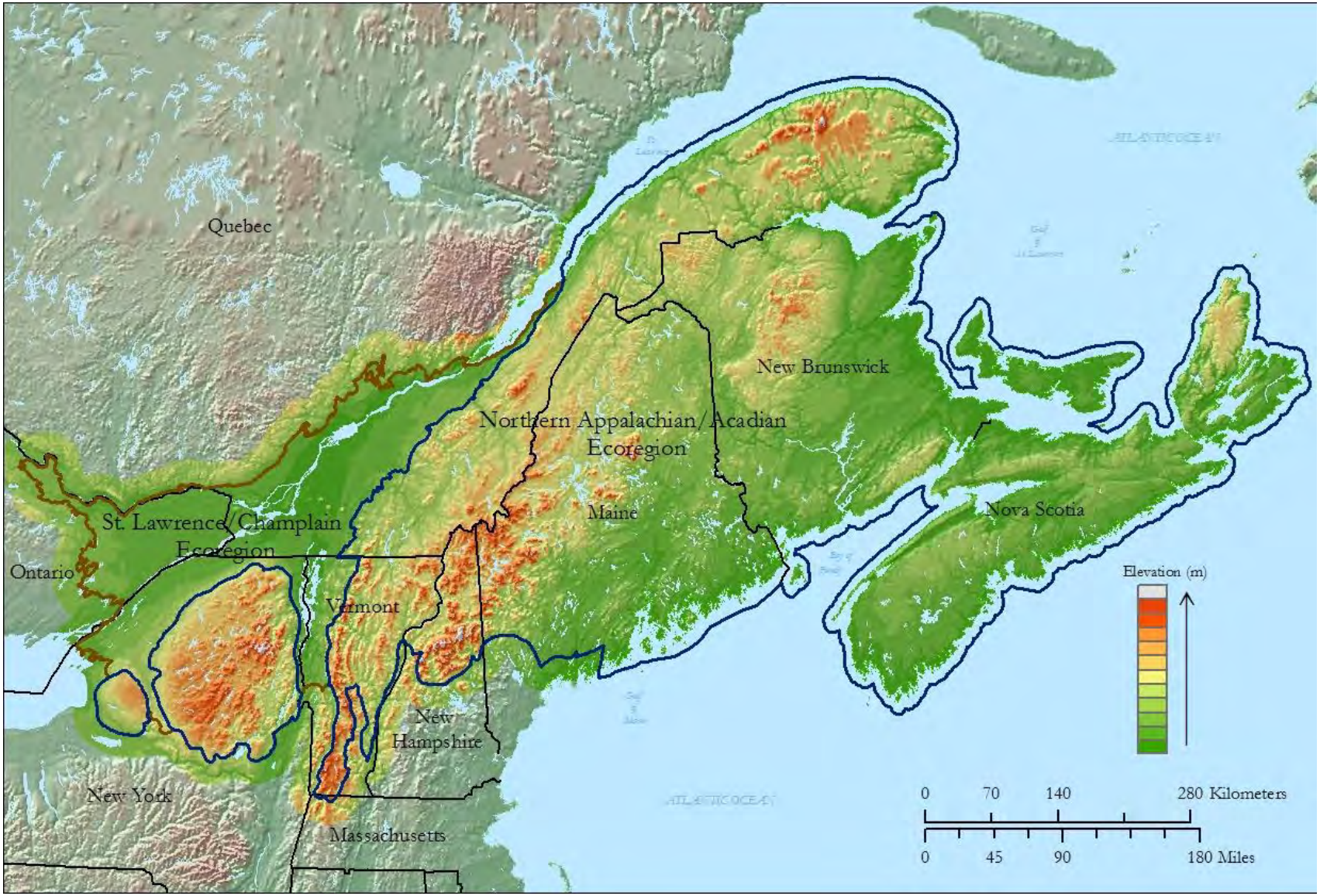


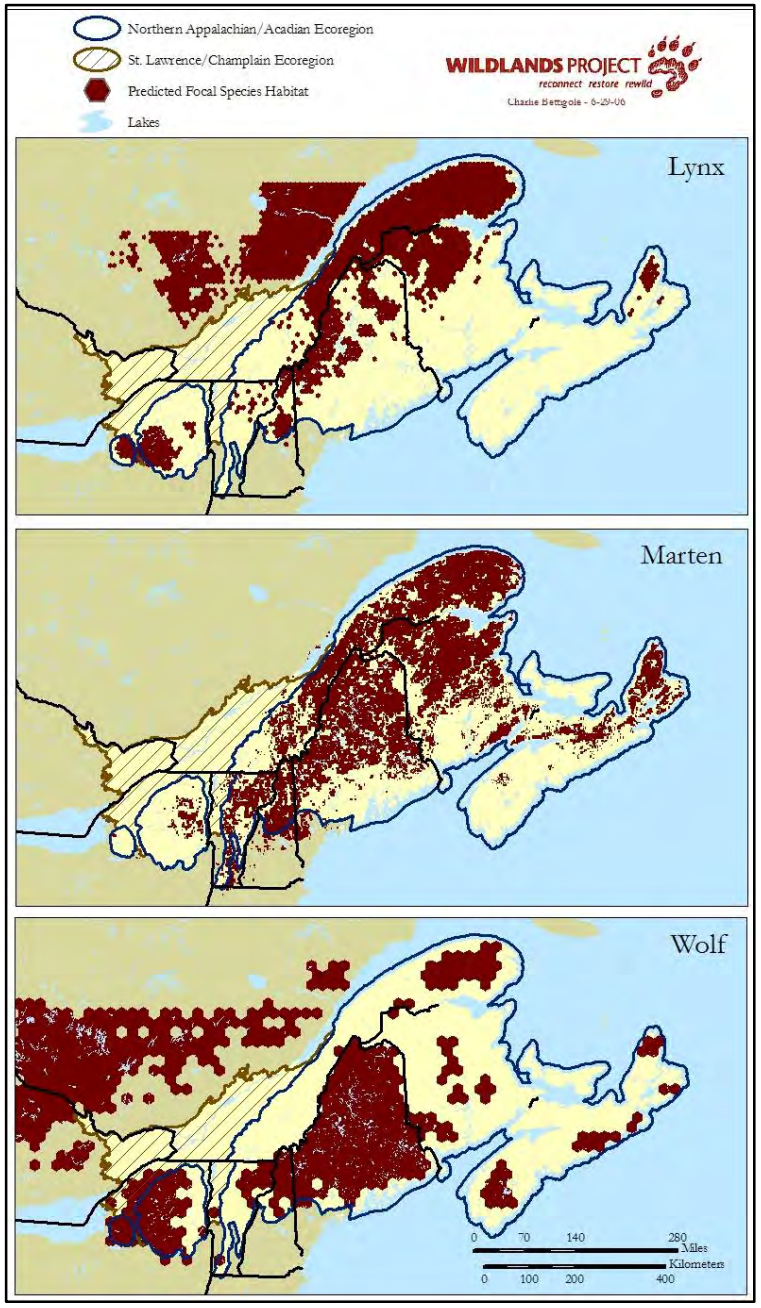
Algonquin to Adirondacks (A2A)

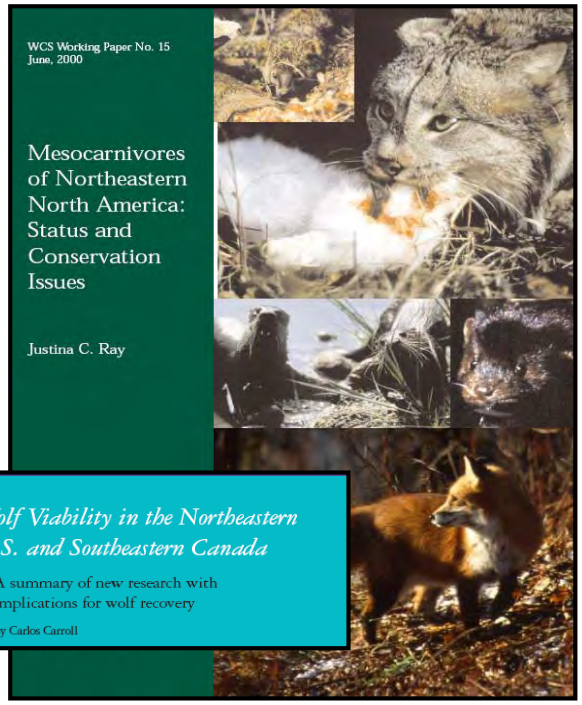
Eastern Wildways Network

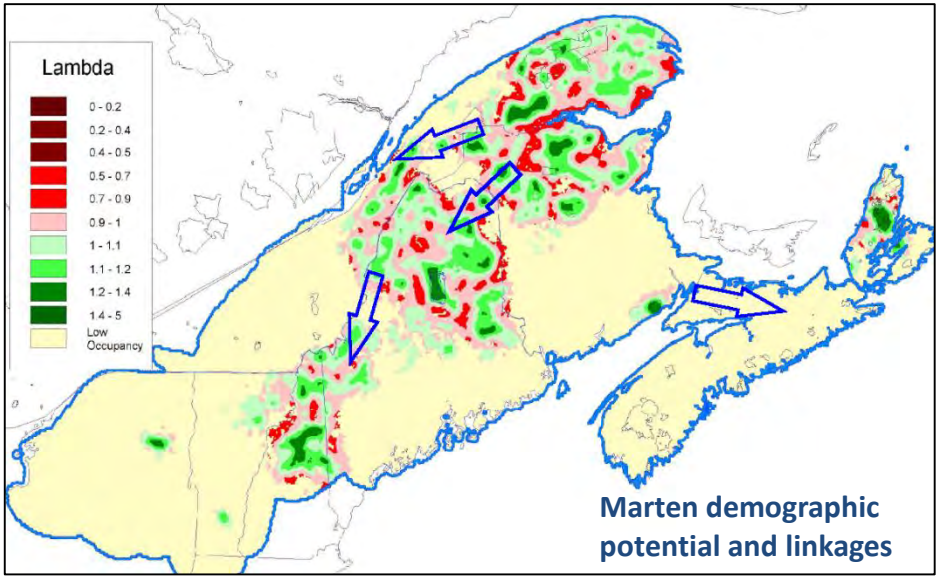


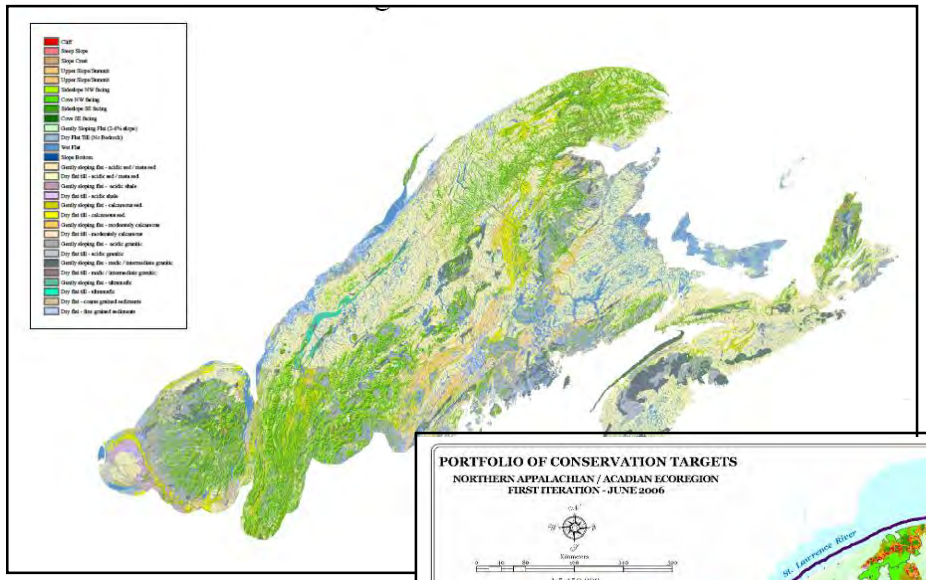
Northern Appalachian/Acadian Ecoregion



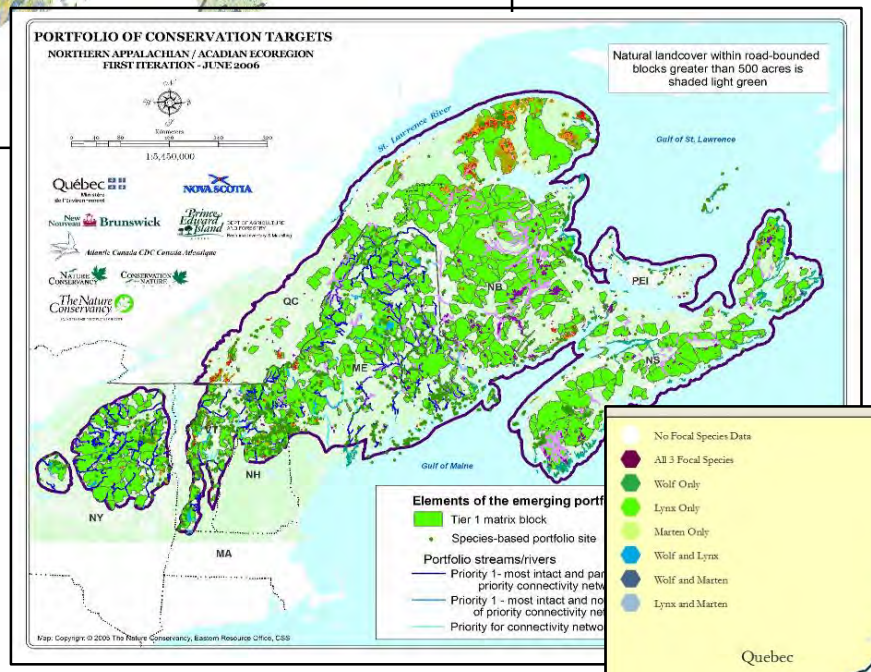

Northern Appalachian/Acadian Ecoregion
St. Lawrence/Champlain Ecoregion
Predicted Focal Species Habitat
Lakes
WILDLANDS PROJECT
reconnect restore rewild
Charlie Bettgole - 6-29-06
Lynx
Marten
Wolf
0 70 140 280 Miles
0 100 200 400 Kilometers


WCS Working Paper No. 15
June, 2000
Mesocarnivores of Northeastern North America: Status and Conservation Issues
Justina C. Ray
Wolf Viability in the Northeastern U.S. and Southeastern Canada
A summary of new research with implications for wolf recovery
by Carlos Carroll

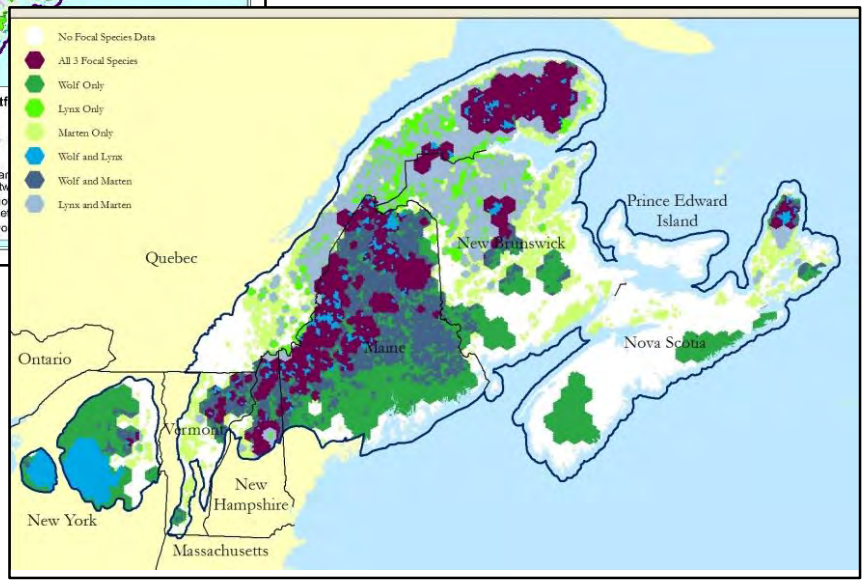

Lambda
0 - 0.2
0.2 - 0.4
0.4 - 0.5
0.5 - 0.7
0.7 - 0.9
0.9 - 1
1 - 1.1
1.1 - 1.2
1.2 - 1.4
1.4 - 5
Low Occupancy
Marten demographic potential and linkages



Environmental variation:
162 ecological land units (TNC)

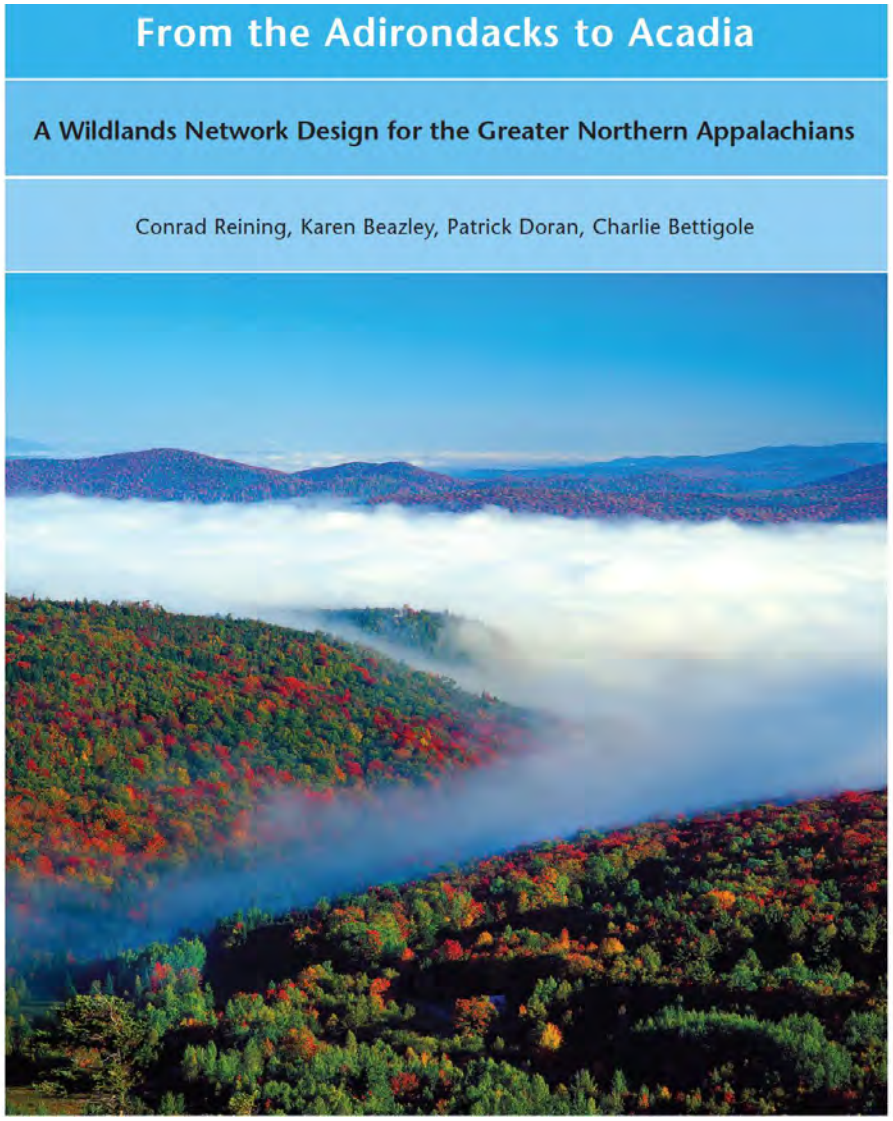


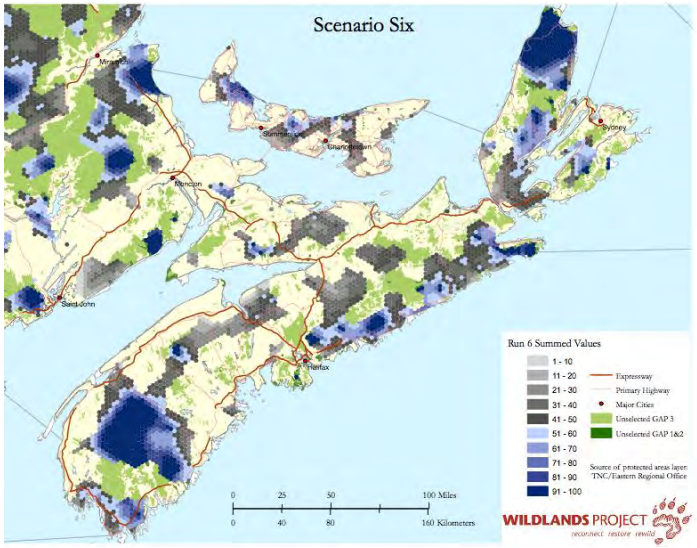
Special elements (TNC):
Rare ecological communities
Tier 1 intact forest blocks

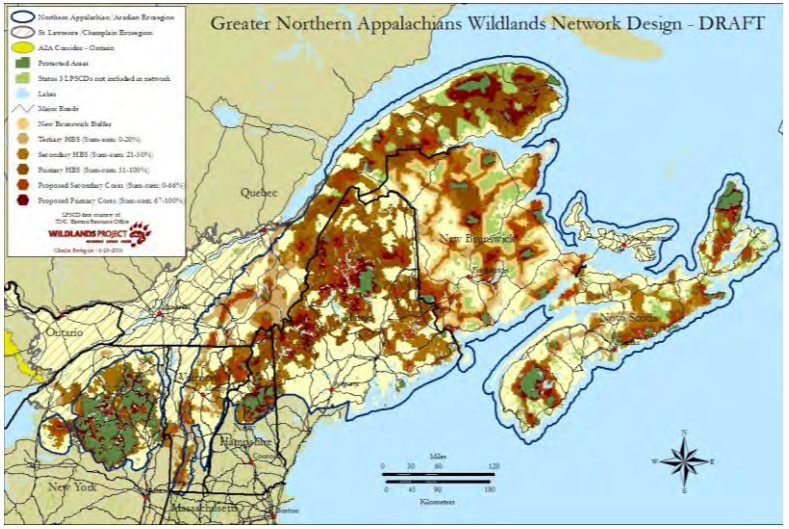


Focal species:
Source habitat (*Carroll 2005*)

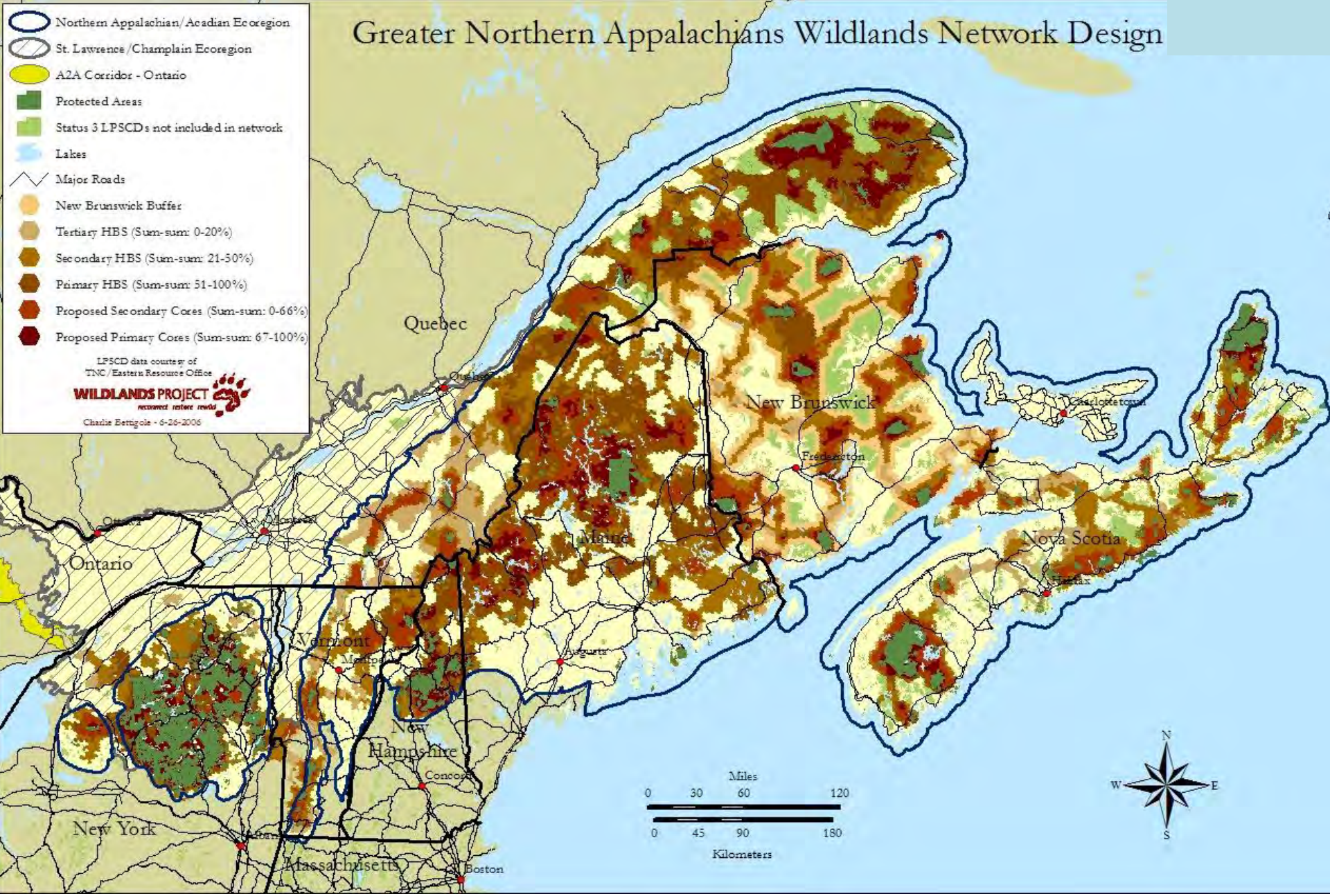
- grey wolf
- Canada lynx
- American marten







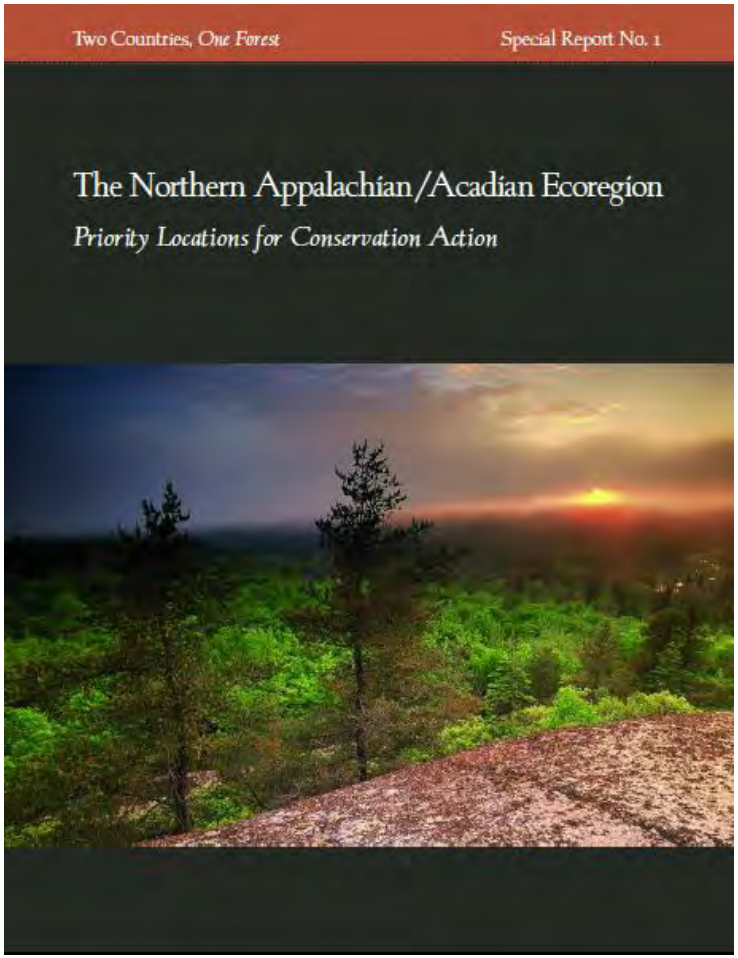
A Wildlands network design for the Greater Northern Appalachians
(Reining et al. 2006)

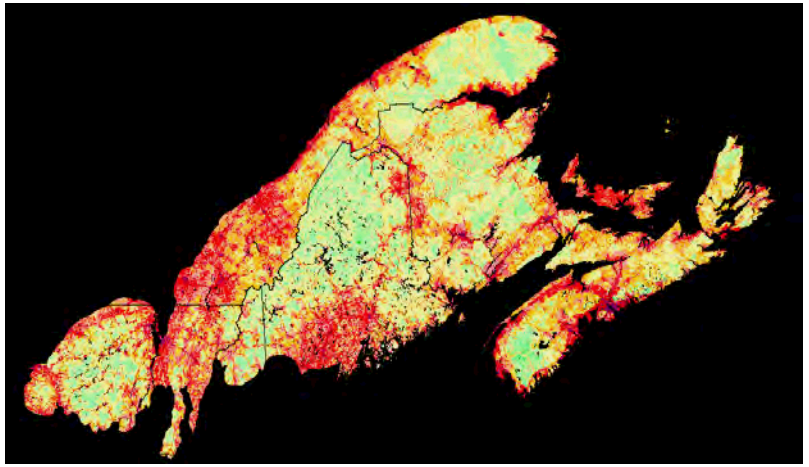


From the Adirondacks to Acadia (Reining et al. 2006)

Priority locations for conservation action

(2C1Forest; Trombulak et al. 2008)



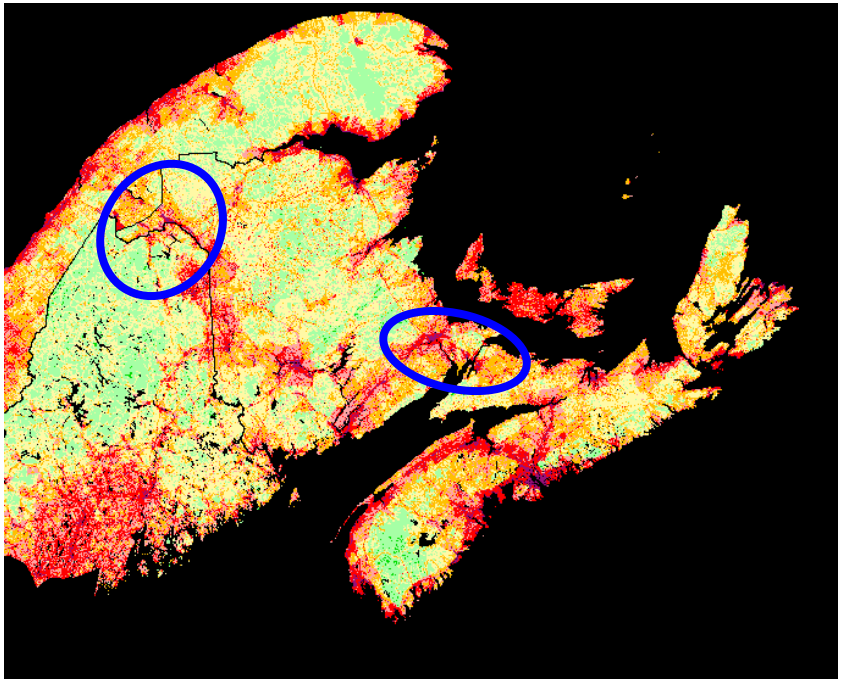


Human footprint (Woolmer et al. 2008)

Critical linkage areas

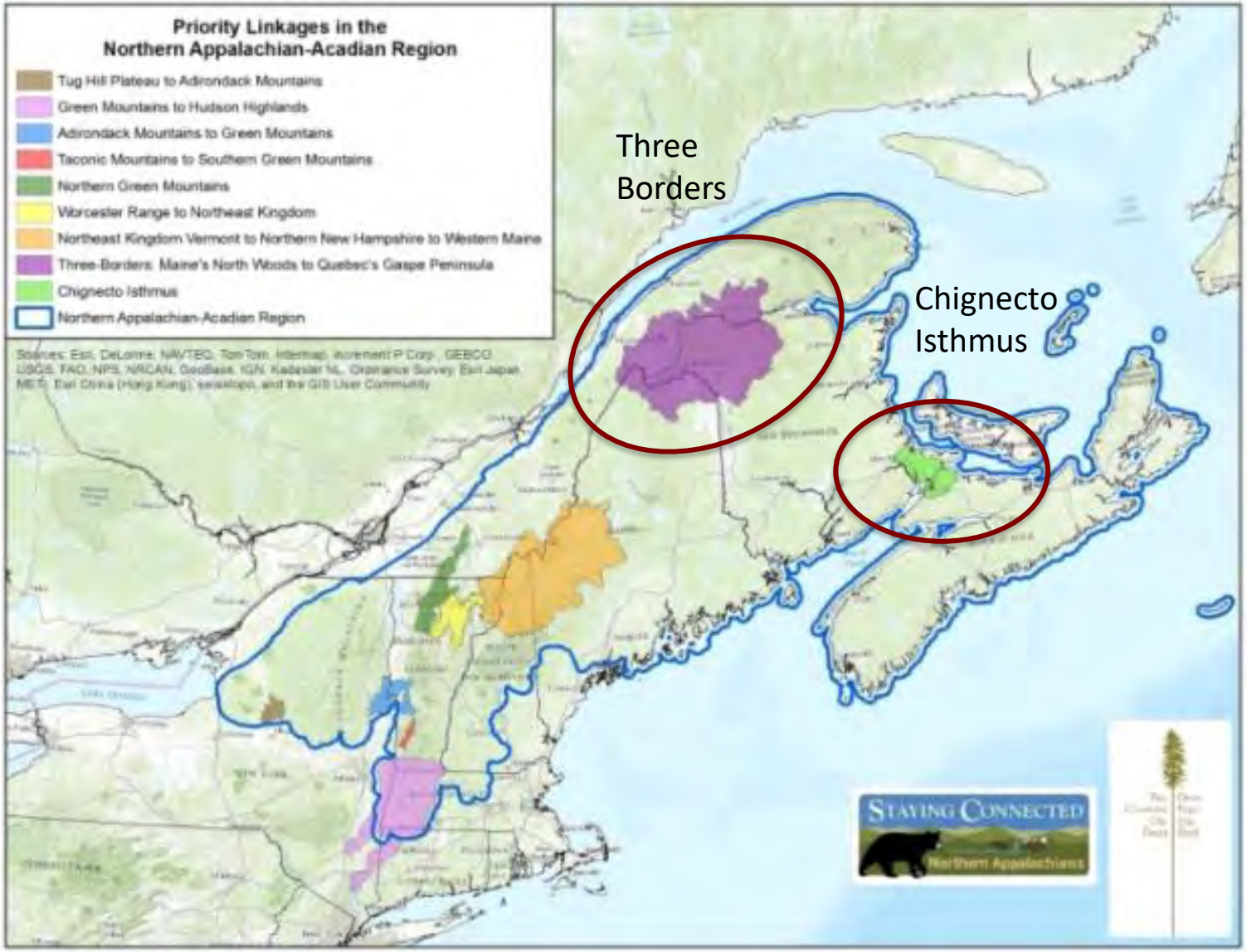
Biodiversity importance

Human footprint



Priority landscape linkages:

Staying Connected Initiative



Ecological connectivity models

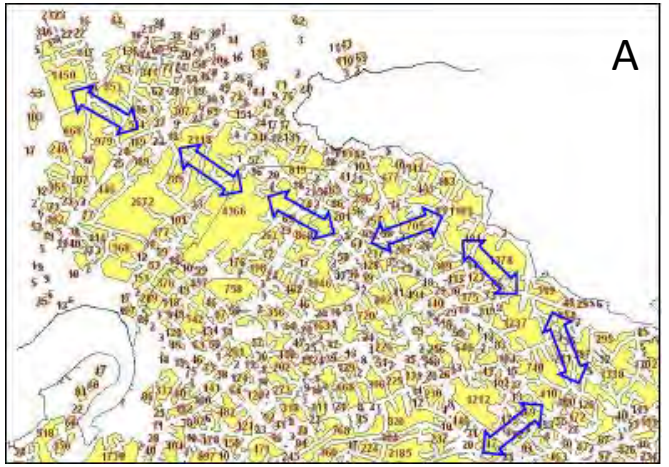
(Perkl and Baldwin 2013; 2C1Forest: Data Basin)

Connectivity scenario:
Low human footprint

Connectivity scenario:
Martin source habitat

Natural ecosystem connectivity across the Chignecto Isthmus (MacDonald & Clowater 2005)

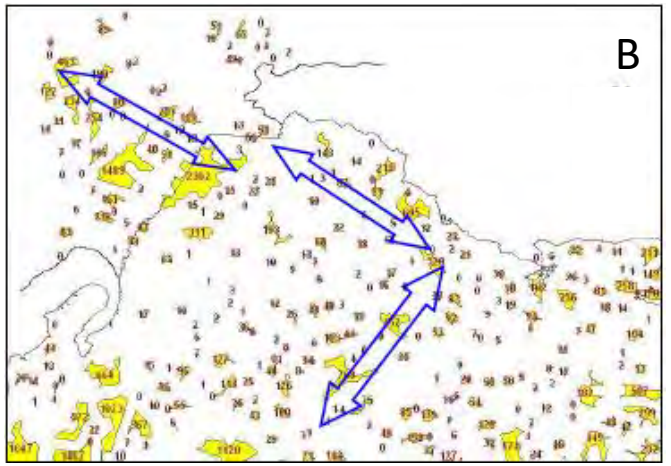
High priority areas for facilitating connectivity



Possible pathways for wildlife connectivity based solely on patch size:

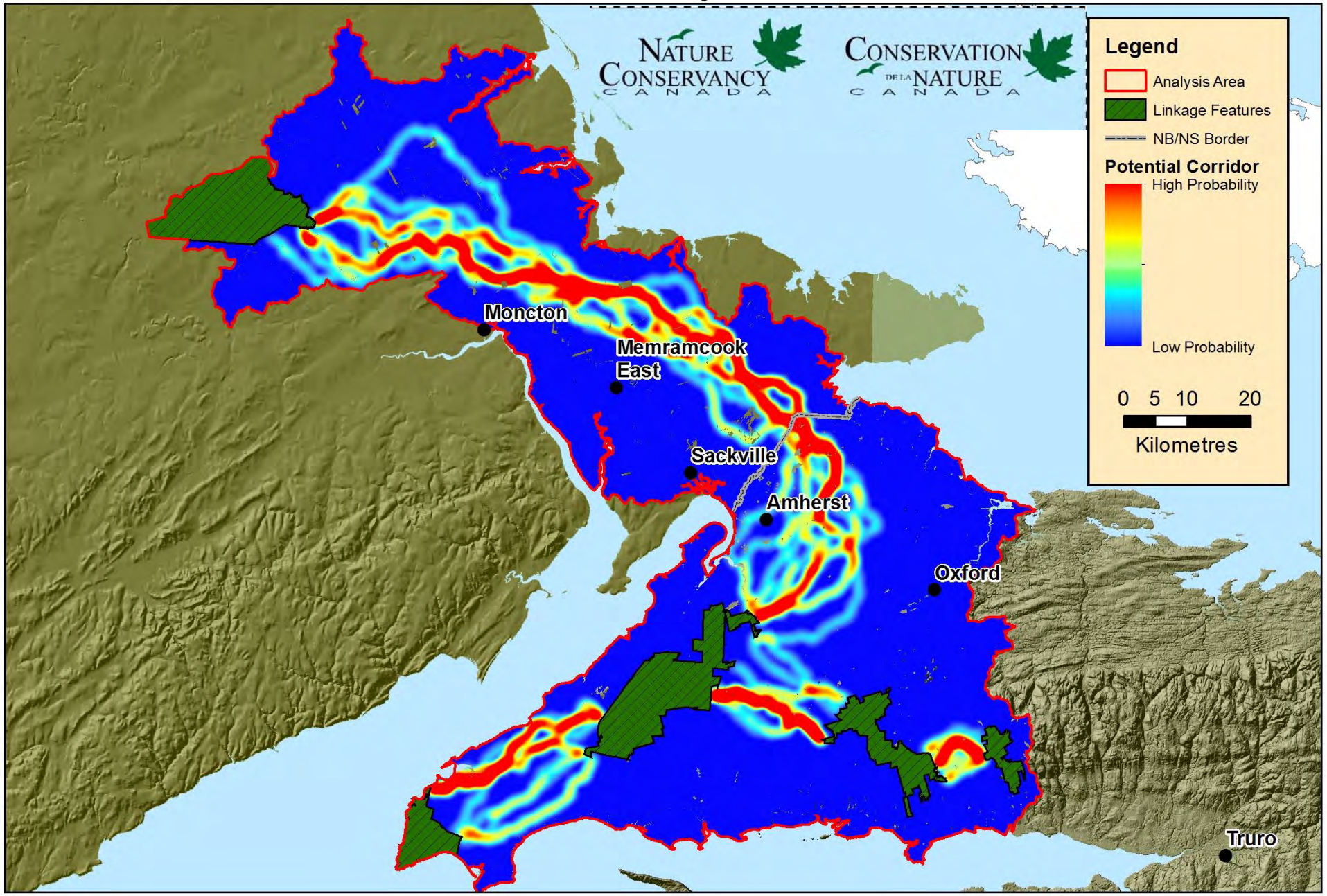
A. 200 m road buffer

Proposed routes for wildlife connectivity corridors based upon 600m road-buffered patches



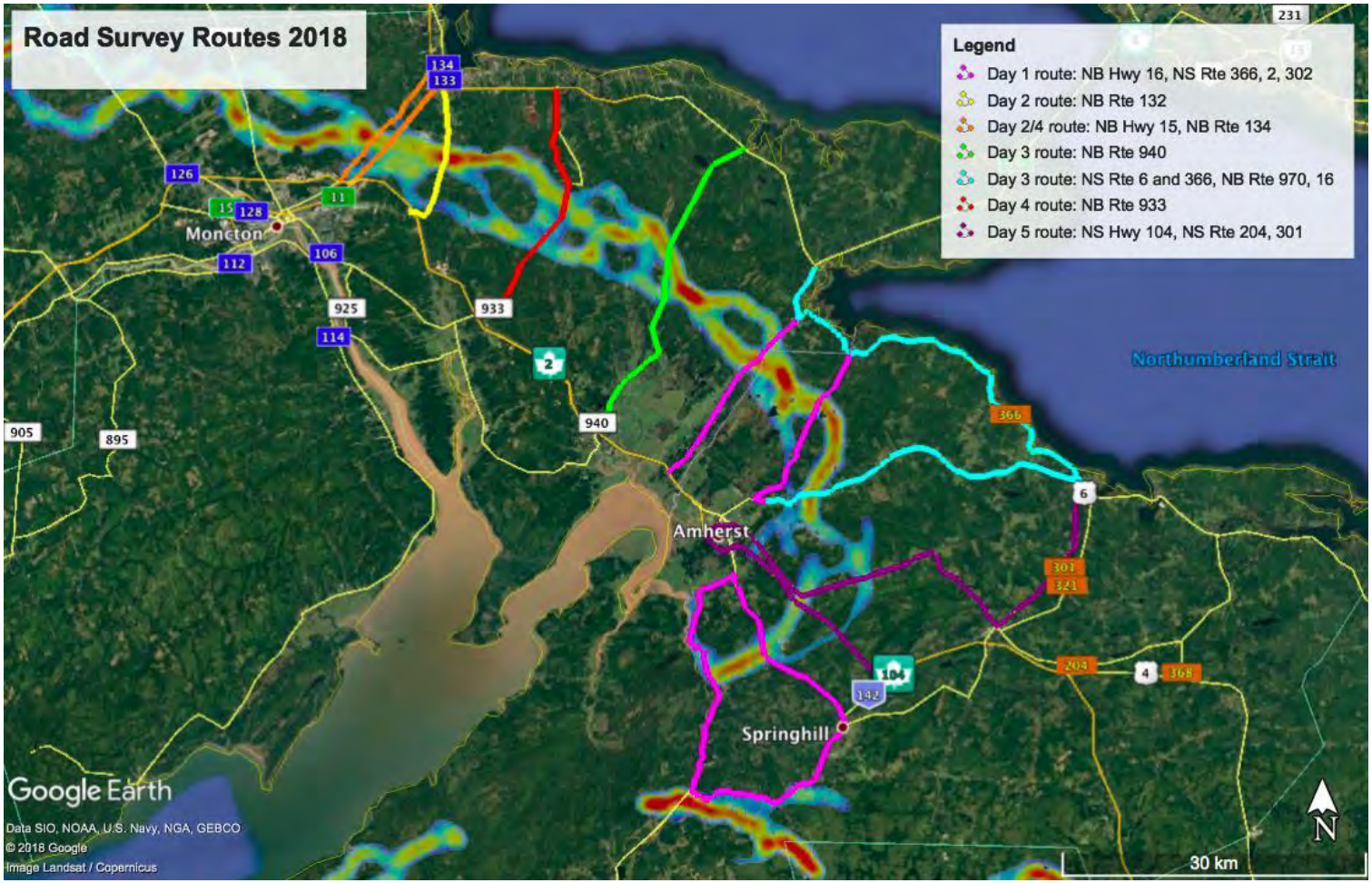
A. 600 m road buffer

CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY



Wildlife Connectivity Analysis for the Chignecto Isthmus Region

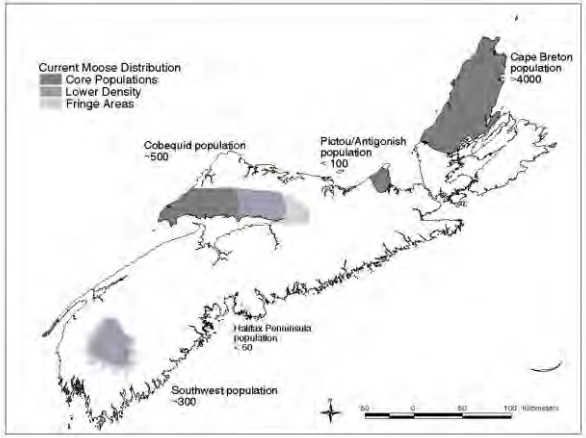
(Nussy 2016)

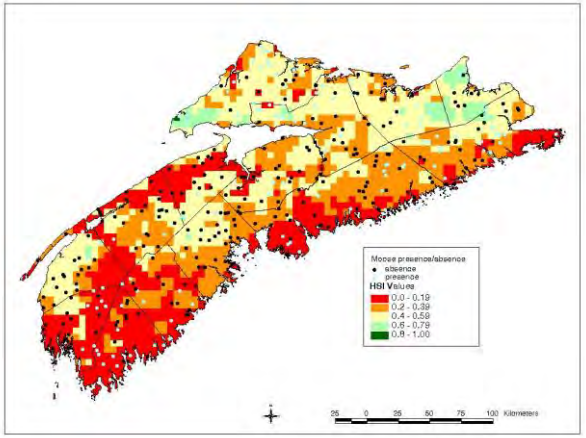


Road survey routes 2018 (A. Barnes)

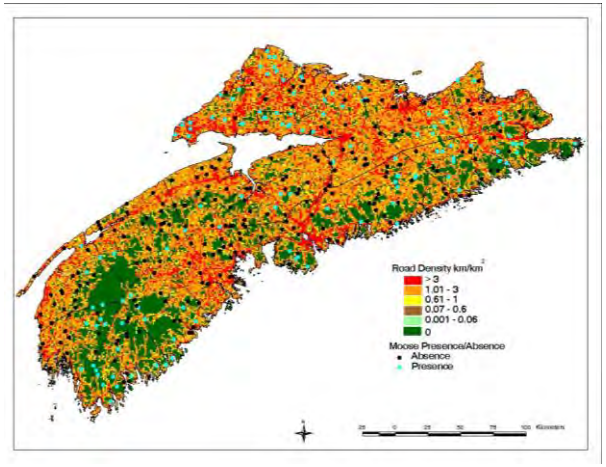
Connectivity for NS mainland moose

(Snaith and Beazley 2004; Snaith et al. 2004; Beazley et al. 2005)

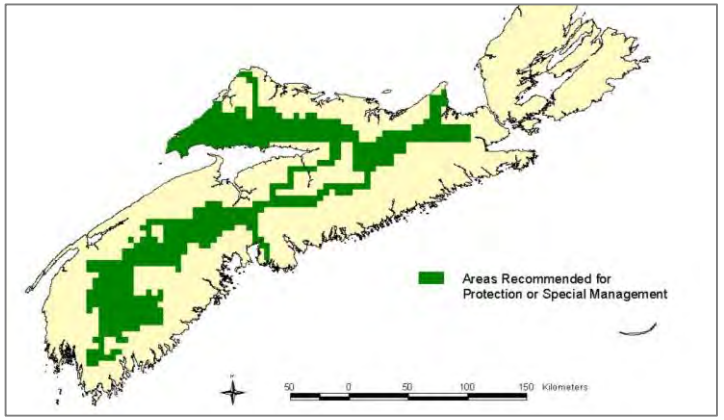




Moose HSI & pellet presence/absence



Road density & moose pellet data

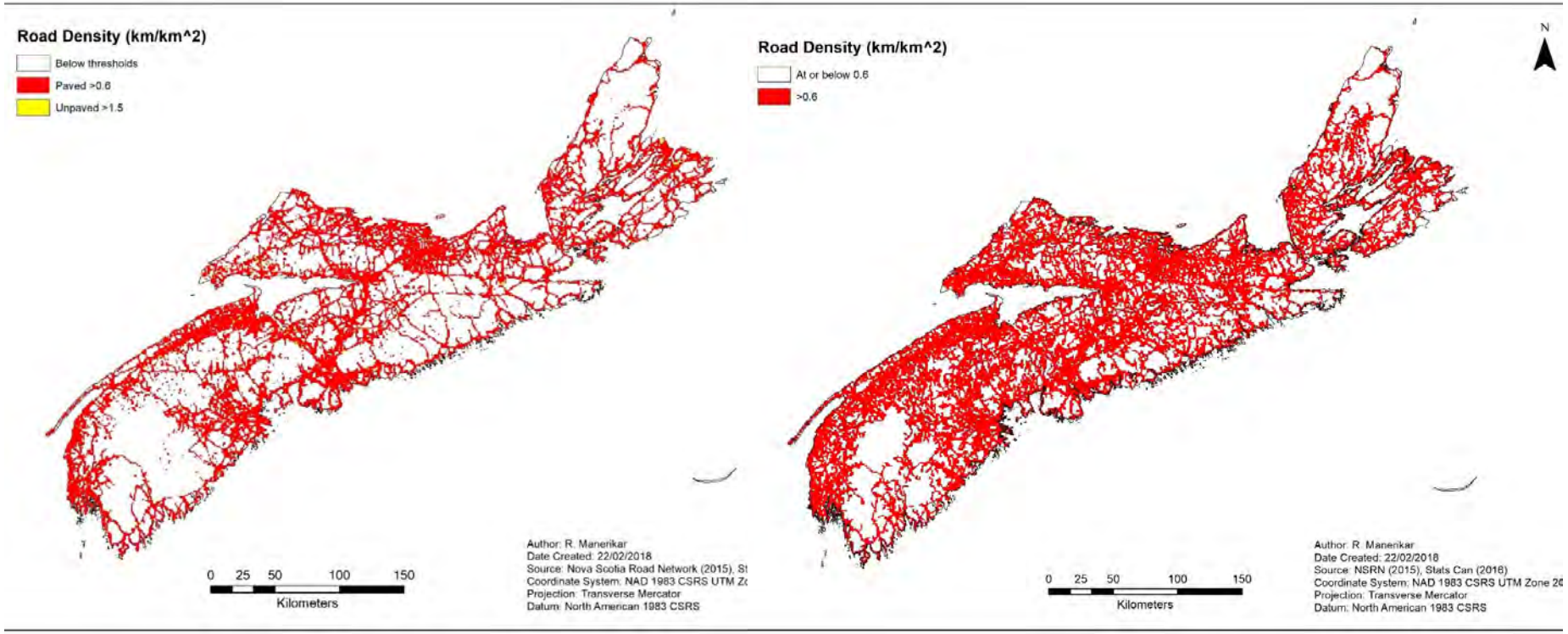


Minimum critical habitat and connectivity for short-term moose viability (14,000 km^2)

Influence of roads on effective habitat

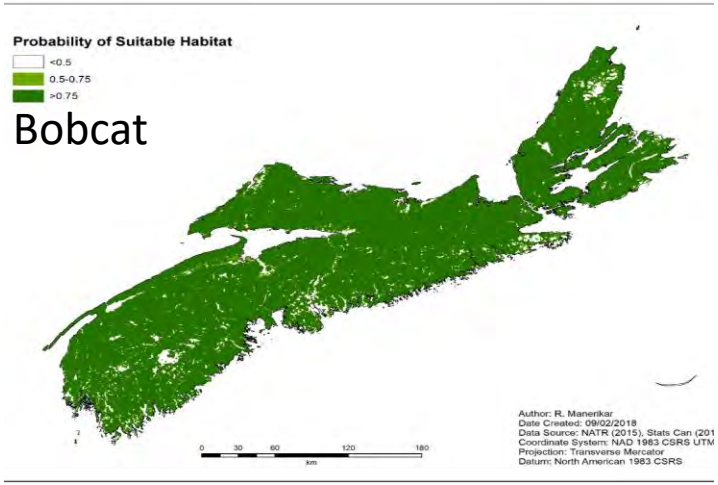
Road density (paved)

Road density (paved & unpaved)

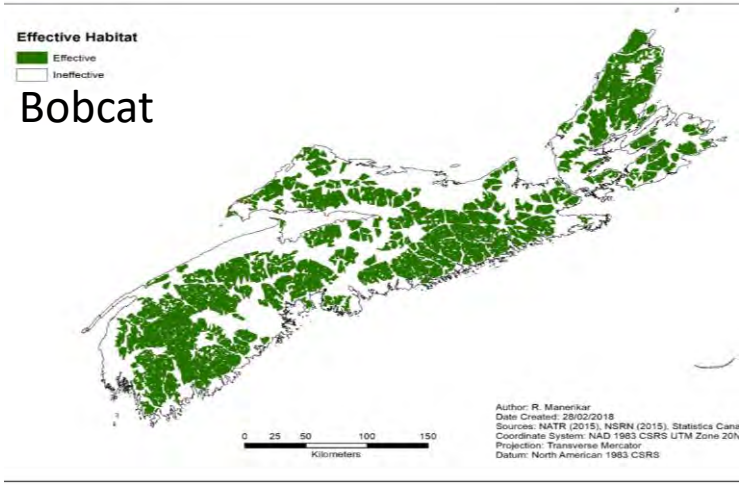


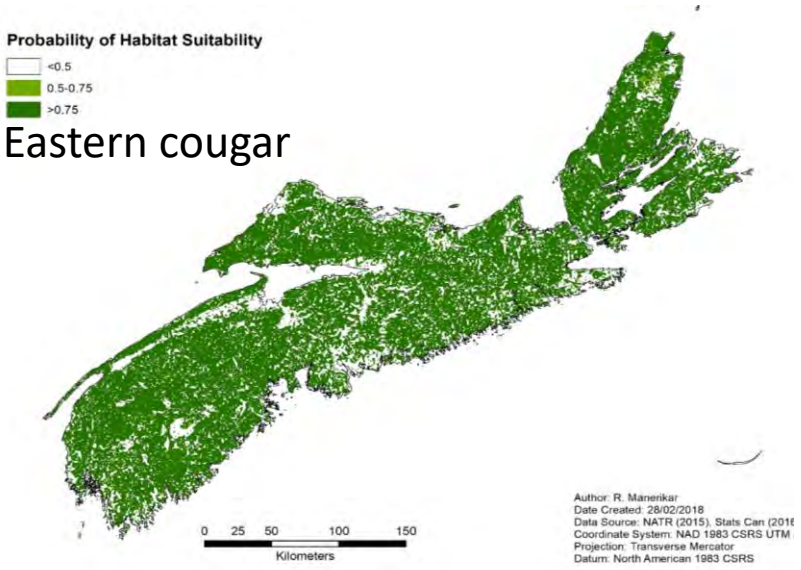
(Manerikar & Beazley 2018)

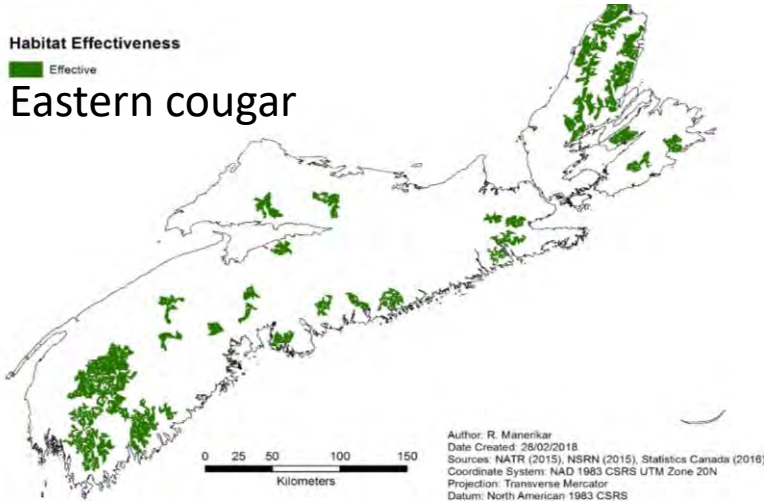
Habitat suitability (HSI only)



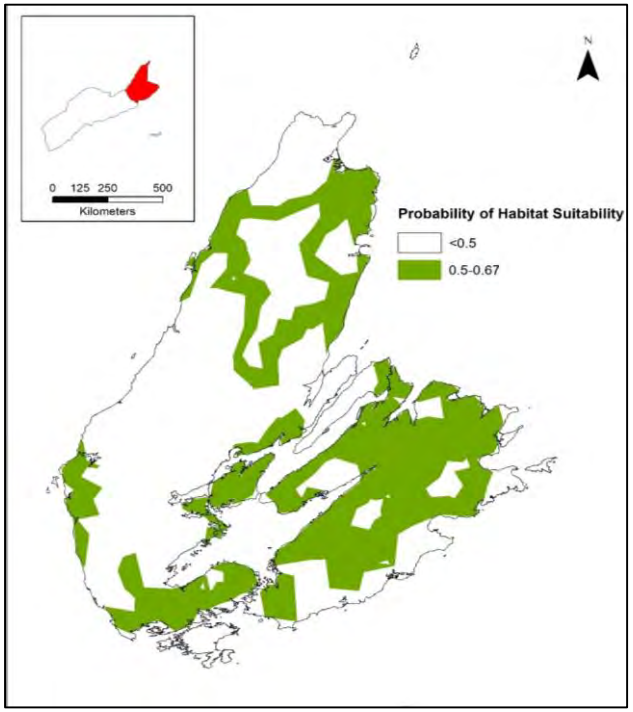
Habitat effectiveness (HSI & road influence buffers)





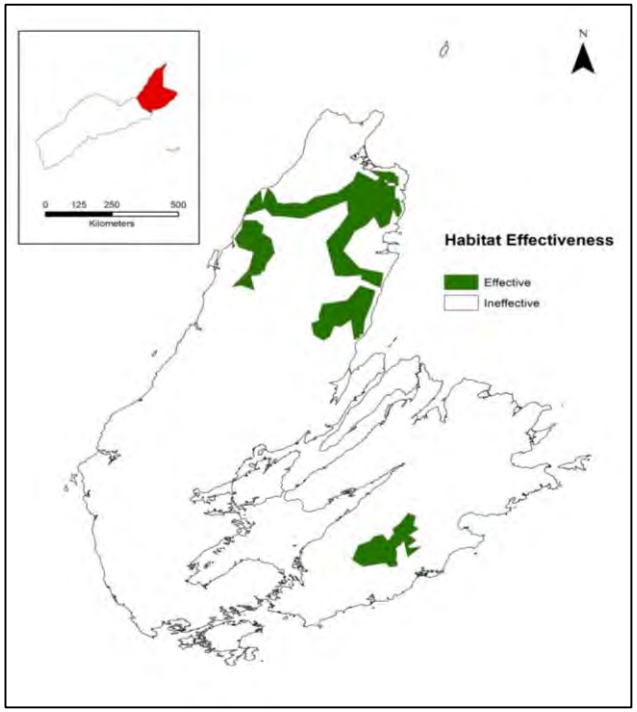


Canada lynx habitat suitability (HSI only)

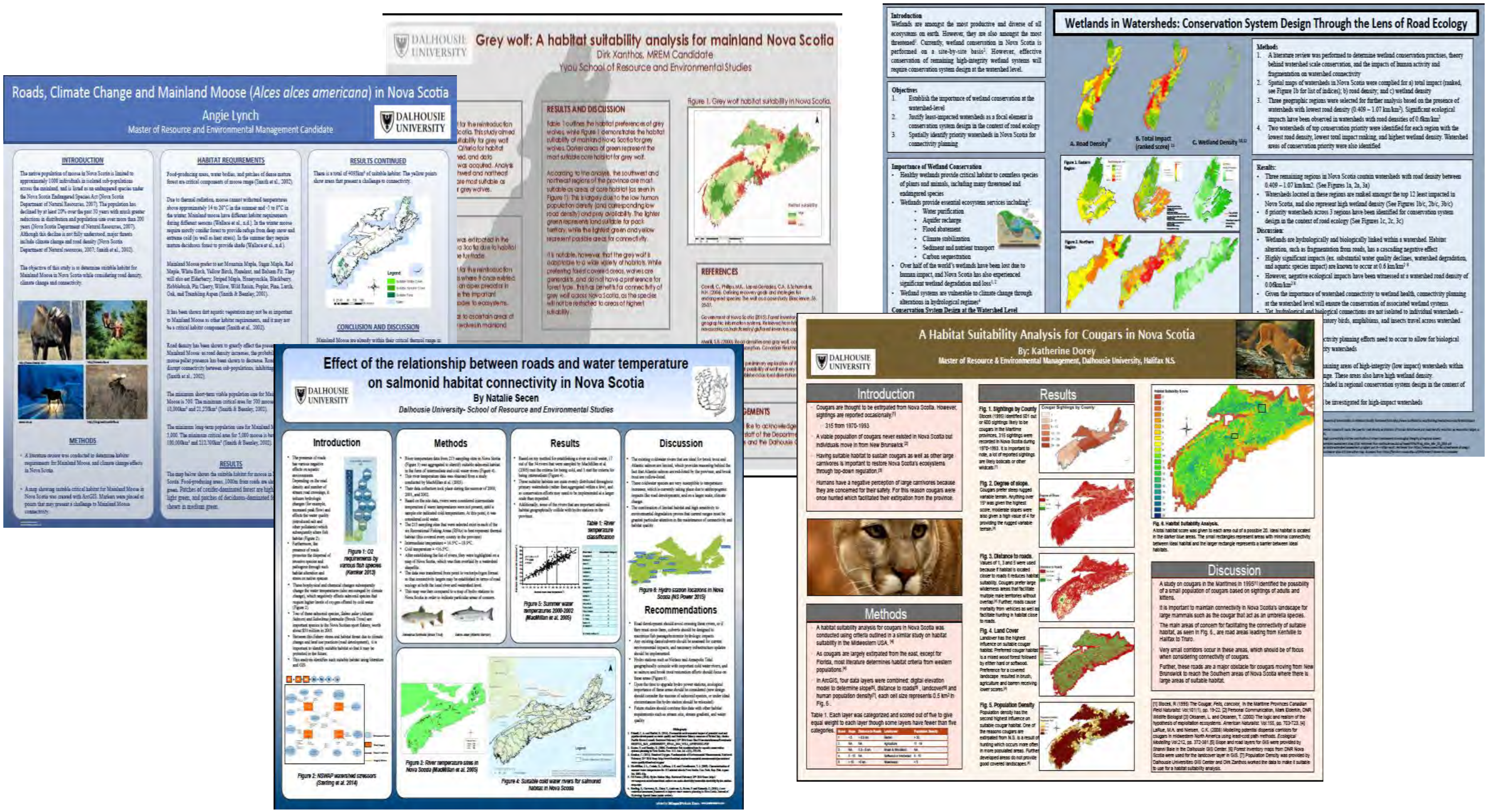


Cape Breton

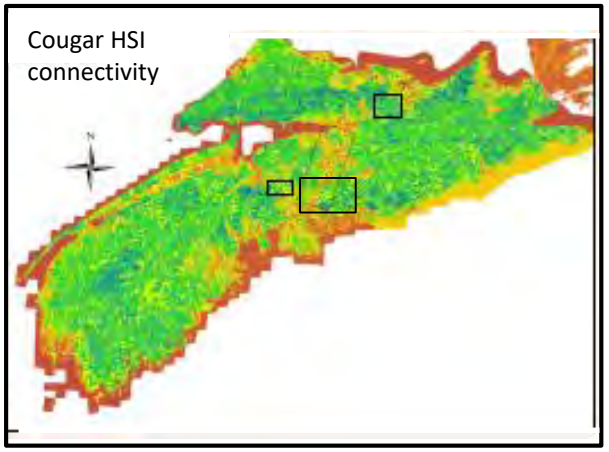
Canada lynx habitat effectiveness (HSI & road influence buffers)

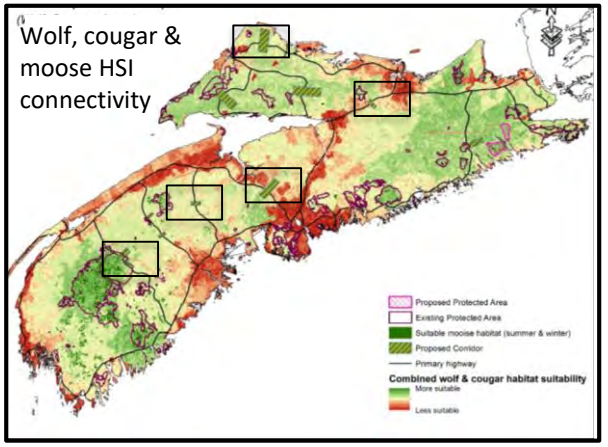


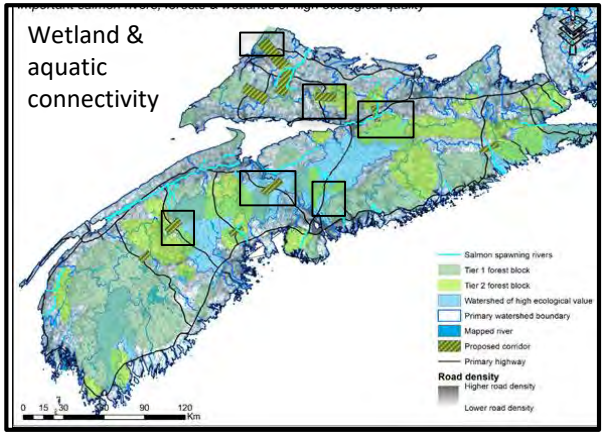
Number of males supported by effective habitat: 7
Number of males required for short-term MVP: 154

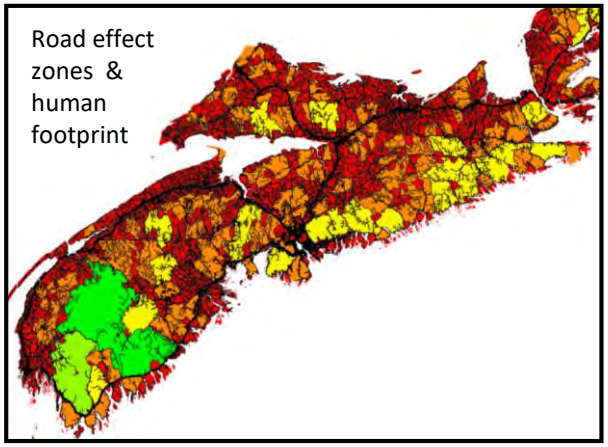

Roads, Climate Change and Mainland Moose (Alces alces americana) in Nova Scotia
Angie Lynch
Master of Resource and Environmental Management Candidate
DALHOUSIE UNIVERSITY
Grey wolf: A habitat suitability analysis for mainland Nova Scotia
Dirk Xanthos, MREM Candidate
Ydou School of Resource and Environmental Studies
Wetlands in Watersheds: Conservation System Design Through the Lens of Road Ecology
Effect of the relationship between roads and water temperature on salmonid habitat connectivity in Nova Scotia
By Natalie Secen
Dalhousie University- School of Resource and Environmental Studies
Introduction
Methods
Results
Discussion
Recommendations
A Habitat Suitability Analysis for Cougars in Nova Scotia
By: Katherine Dorey
Master of Resource & Environmental Management, Dalhousie University, Halifax N.S.
Introduction
Results
Methods
Discussion

Key provincial-scale pinch points of connectivity for various species, ecosystems and processes

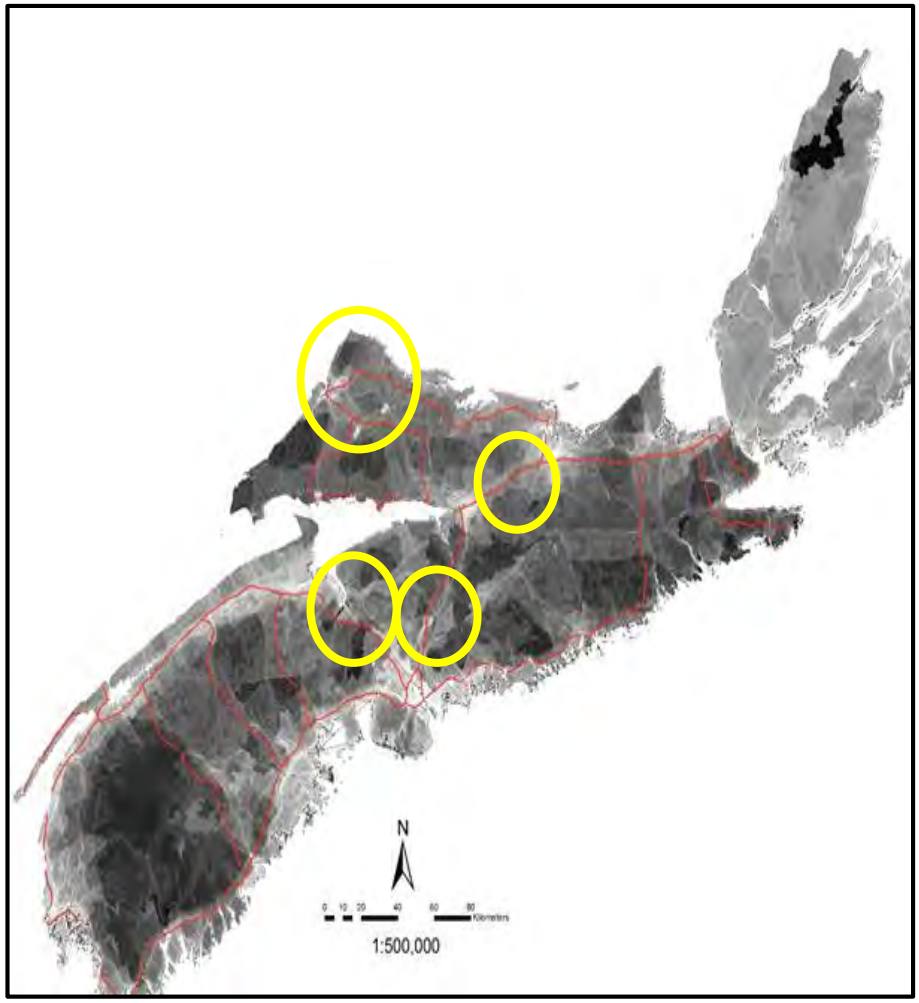


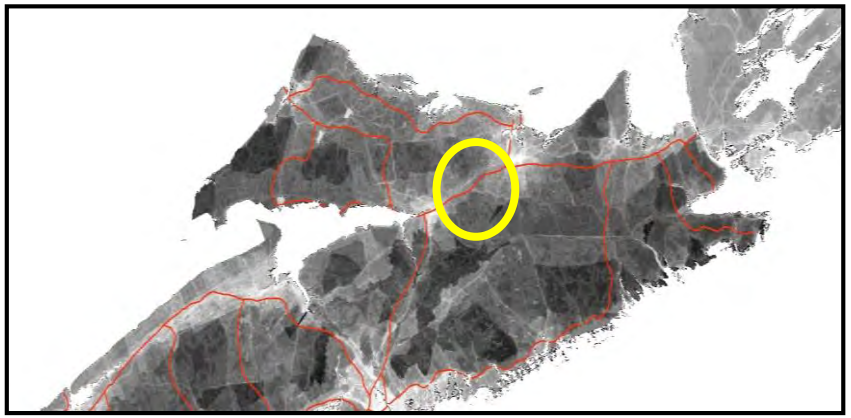


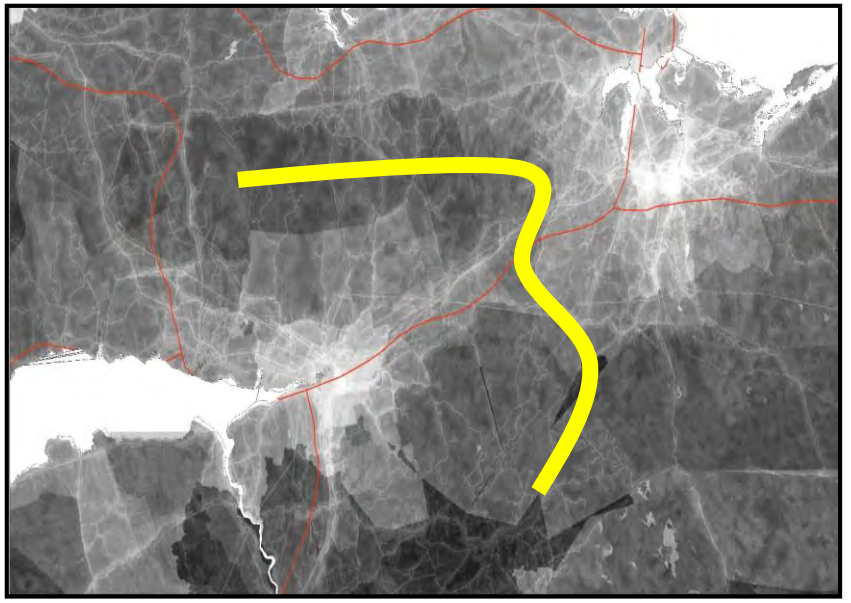




Key areas for maintaining & restoring connectivity across highways

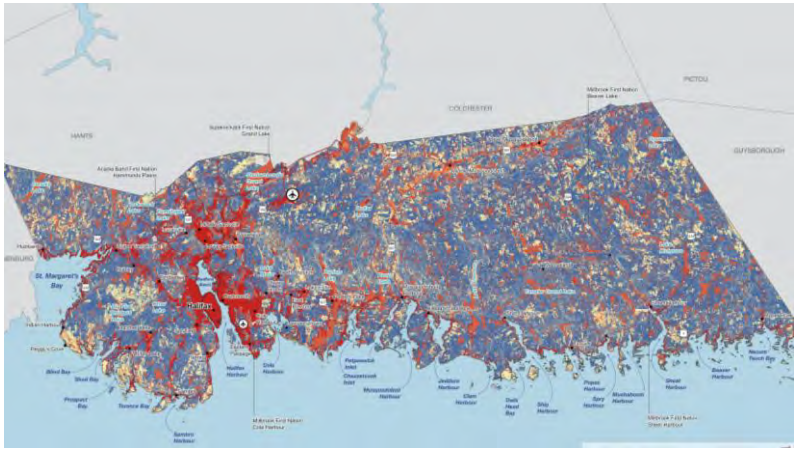






Halifax Green Network Plan (2018)

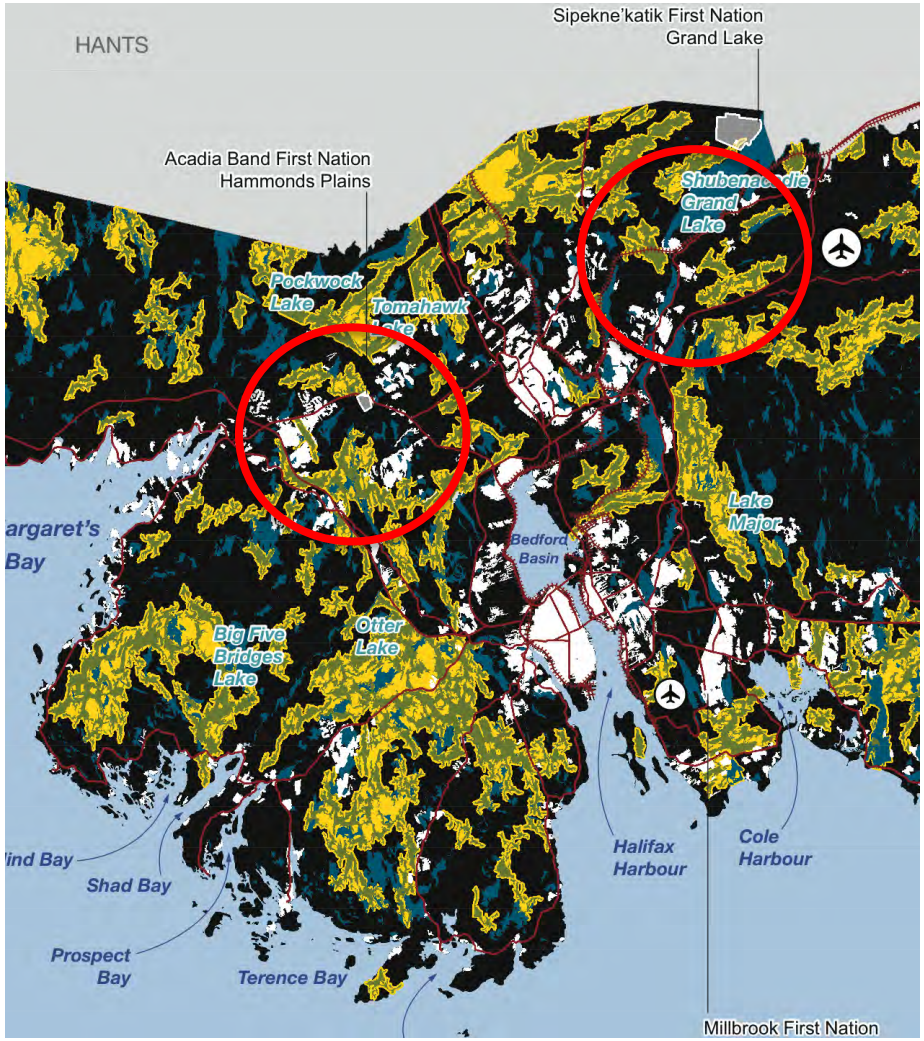
State of the Landscape Report



Land cover friction to wildlife movement

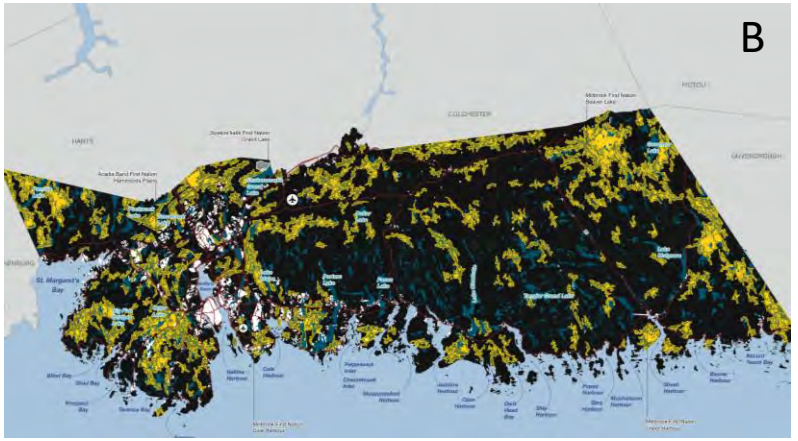
Landscape connectivity

Generalized connectivity & pinch points to wildlife movement

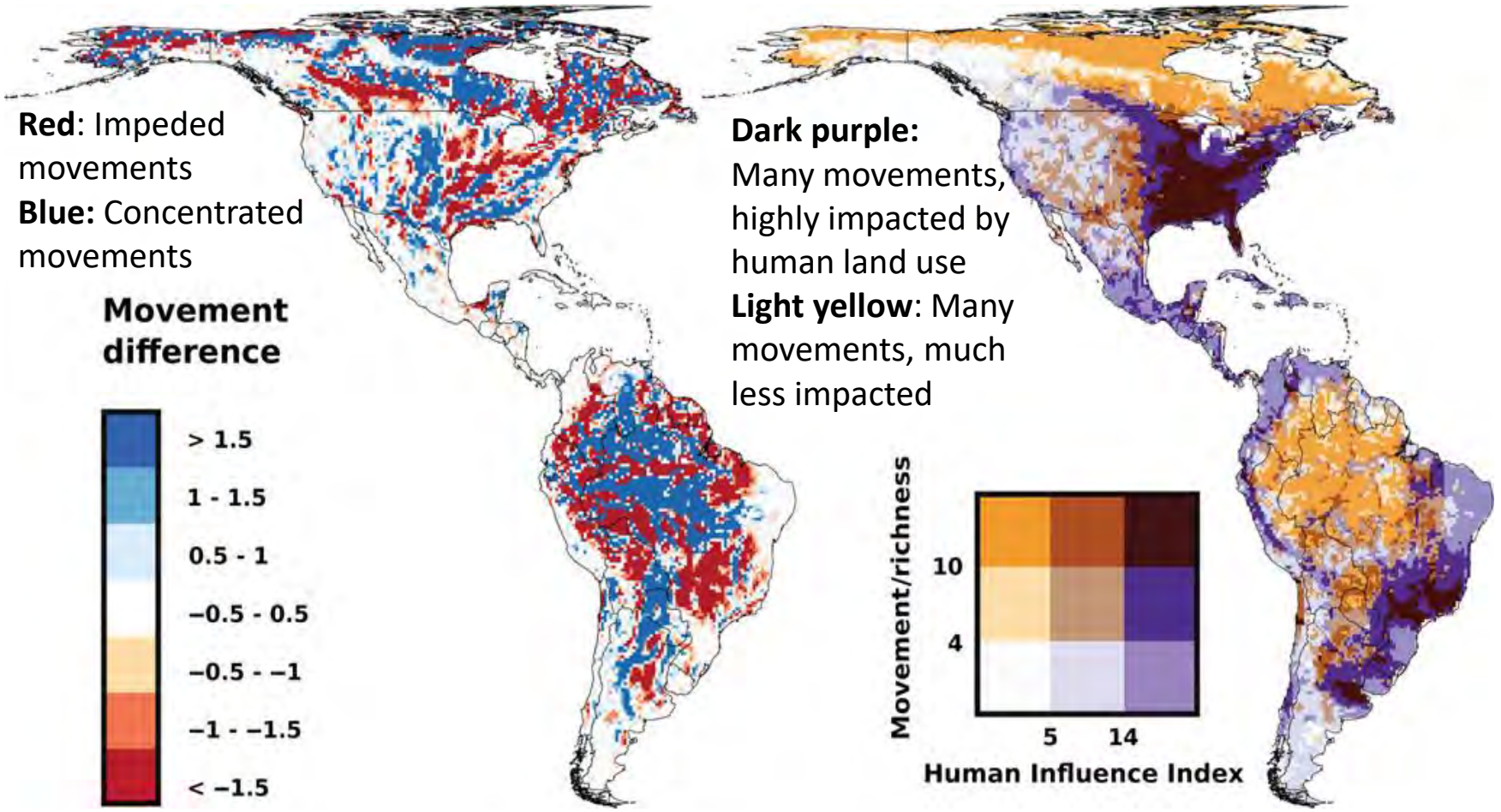


A. Generalized connectivity

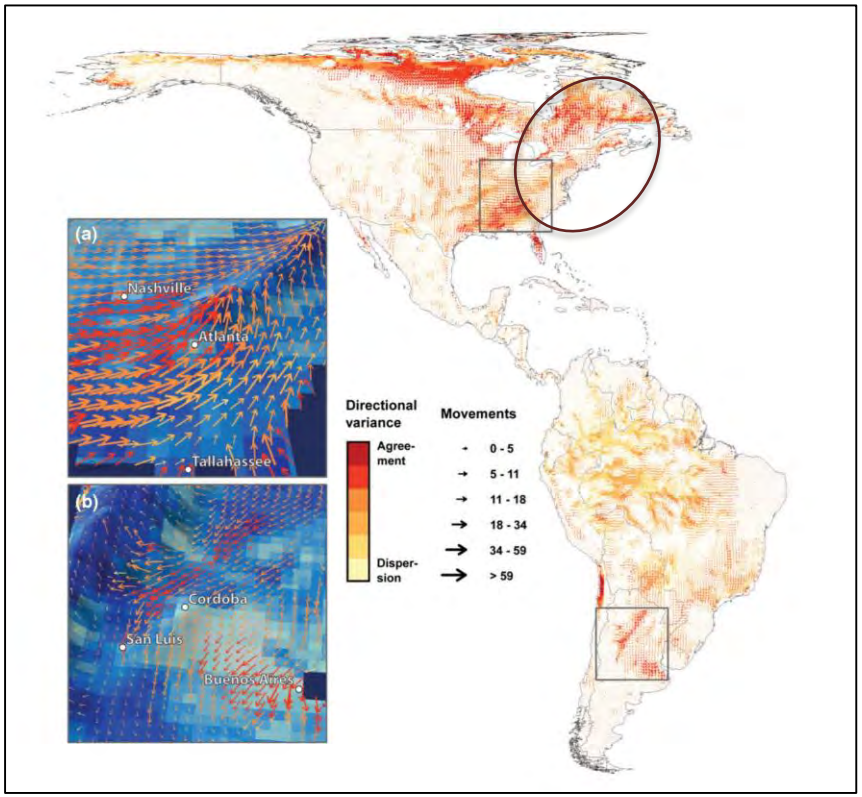
B. Pinch points to wildlife movement



Climate driven species movements via routes that avoid human land use



(Lawler et al. 2015)



Cool Green Science

Smarter By Nature

| CLIMATE CHANGE |

Migration in Motion: Visualizing Species Movements Due to Climate Change

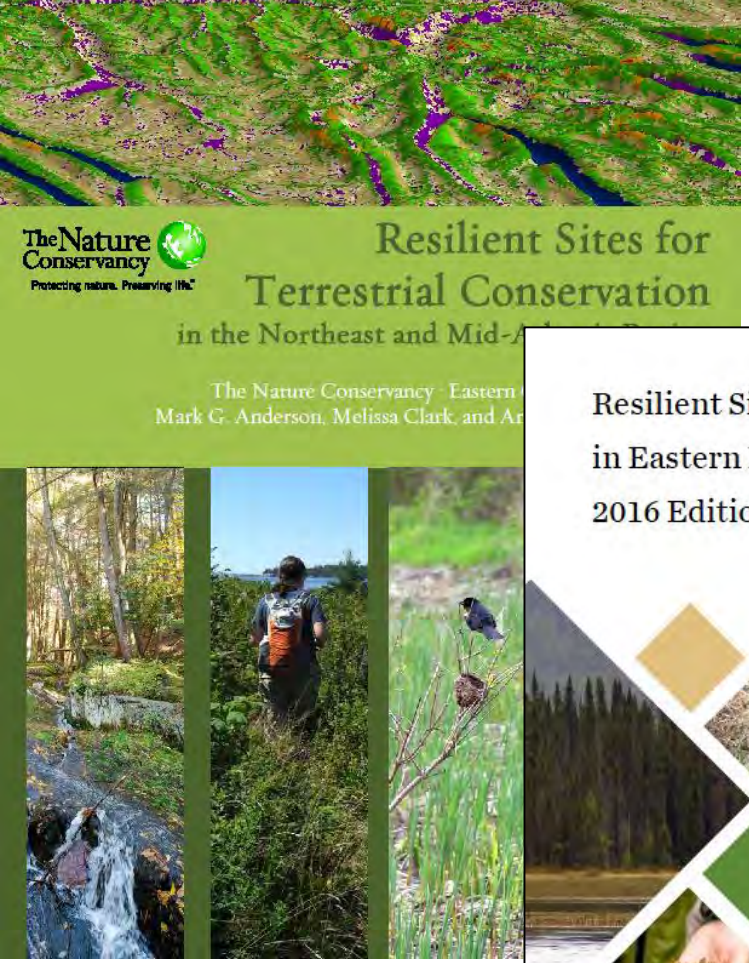
BY JUSTINE E. HAUSHEER

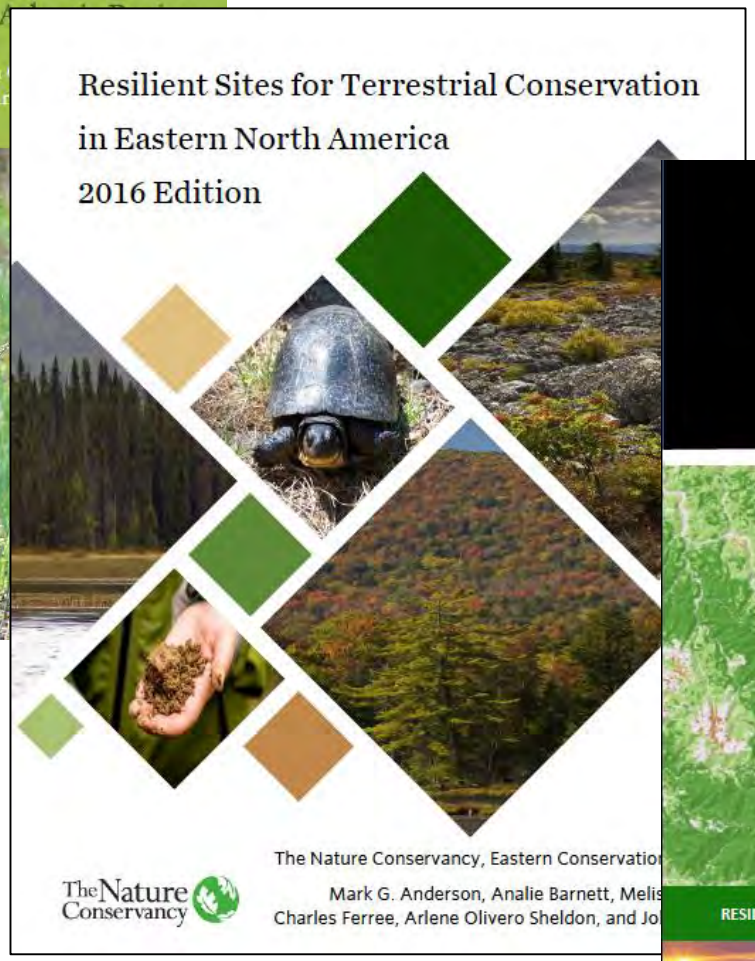
AUGUST 19, 2016 | Follow Justine

https://blog.nature.org/science/2016/08/19/migration-in-motion-visualizing-species-movements-due-to-climate-change/

(Lawler et al. 2015)

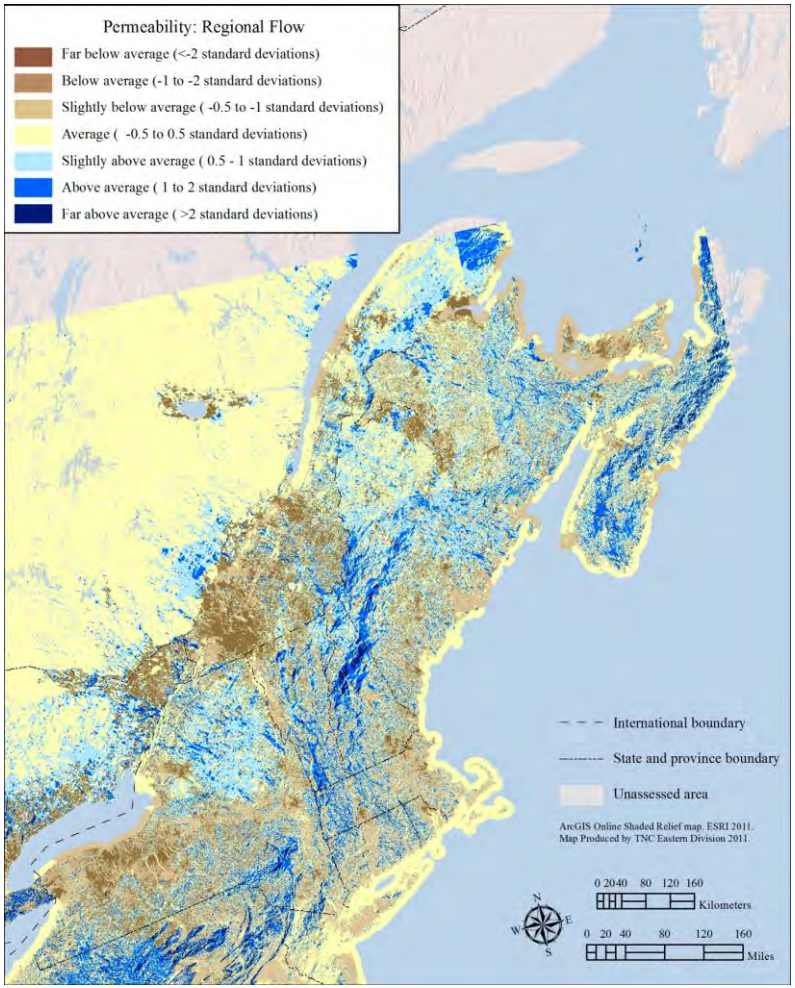
Resilient sites & Regional flows



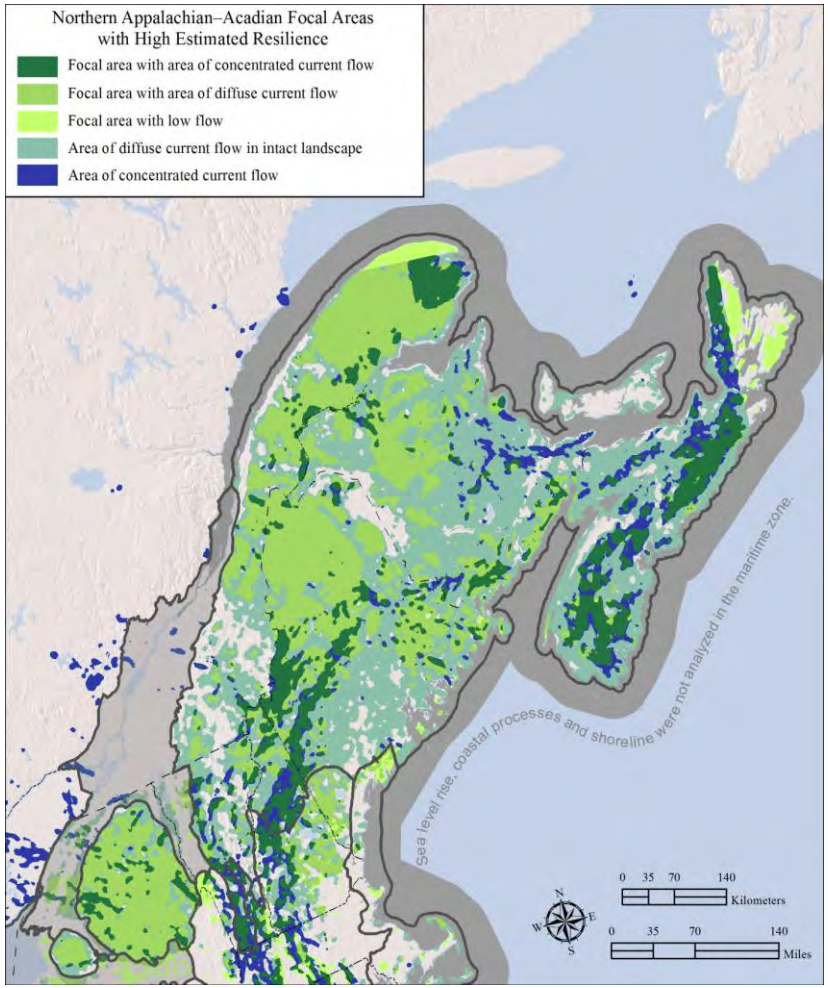


(Anderson et al. 2012; 2016a,b)

Regional flows
Anderson et al. 2012



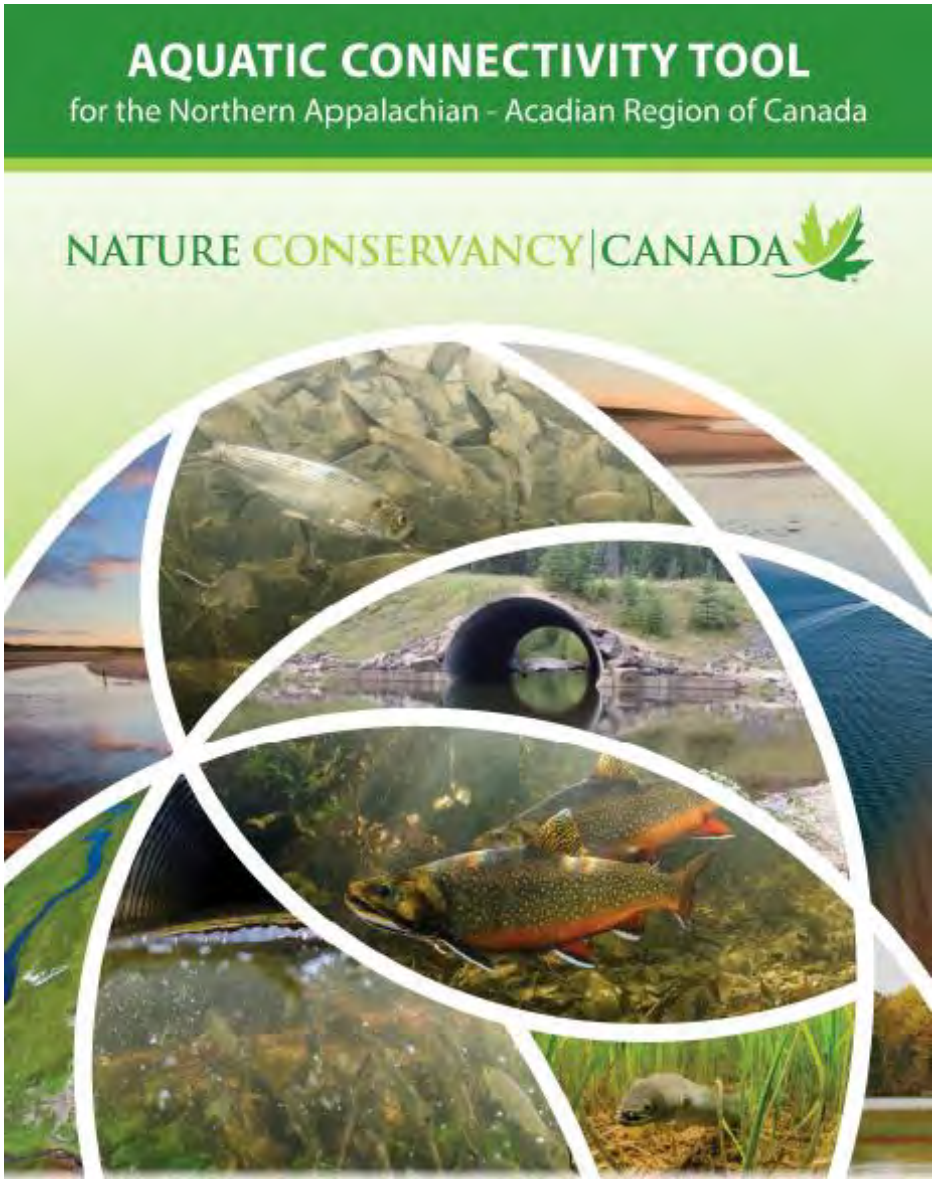
Resilience and regional flows
Anderson et al. 2012

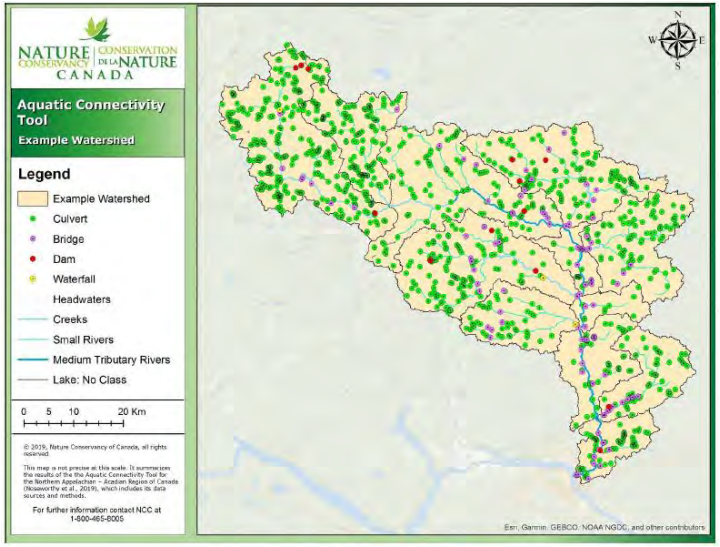


Prioritized resilient & connected sites

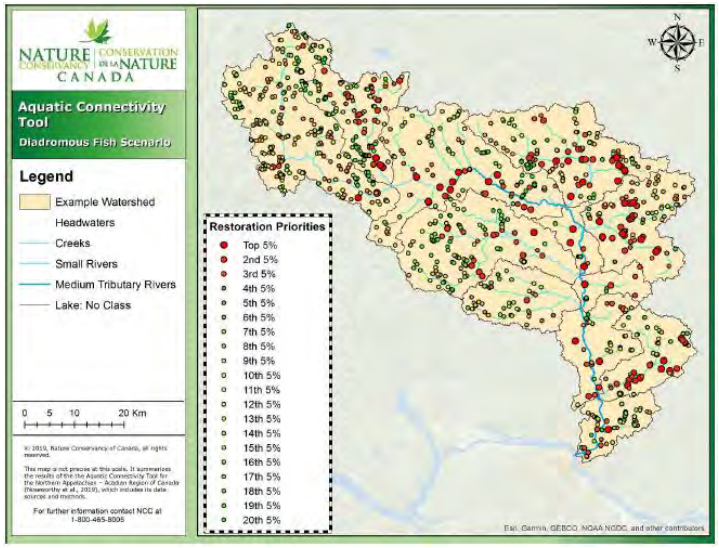
(Anderson et al. 2016)

Resilient areas that meet criteria for diversity and permeability, and the linkages between sites that have high flow and connect three or more diversity features





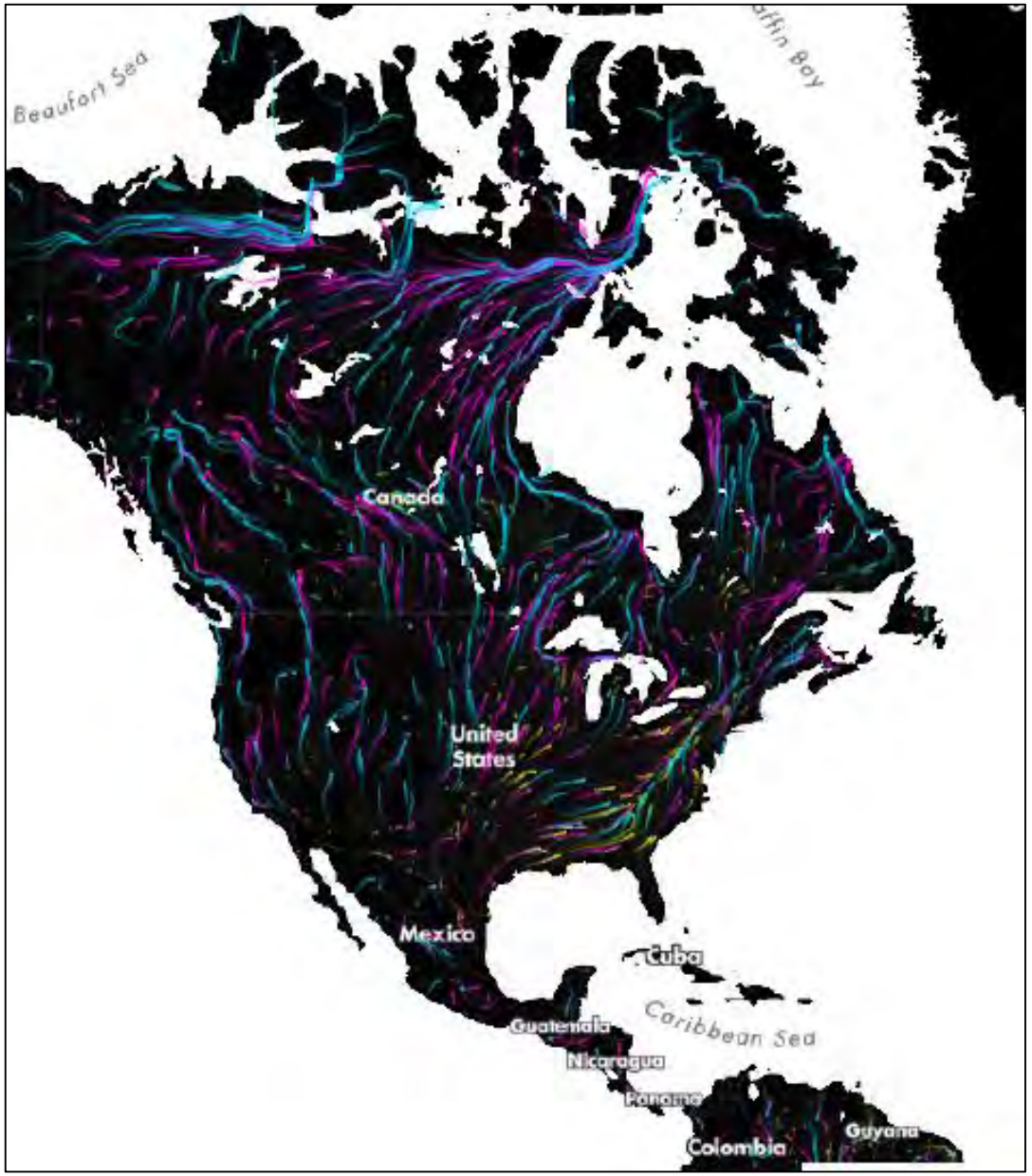
Culverts, dams, bridges, waterfalls



Restoration priorities for diadromous fish

Migration in motion: Visualizing species movements due to climate change

https://blog.nature.org/science/2016/08/19/migration-in-motion-visualizing-species-movements-due-to-climate-change/



Thank you

karen.beazley@dal.ca

Resolution 40-3, A lever to ecological connectivity

Mrs Danielle St-Pierre, director (Co-chair)

Mr. John Austin, director (Co-Chair)

Presentation Plan

- What is the CNEG-ECP ?
- An overview of connectivity
- Resolution 40-3
  - Its content
  - The engagements
  - Implementation
- Working group on the Implementation of Resolution 40-3 (CNEG-ECP)
  - Accomplishments since 2017
  - Goals, Objectives and Actions
  - Uncoming actions
- Key messages

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CNEG-ECP

Conference of New England Governors and Eastern Canadian Premiers (NEG-ECP)

- 5 provinces and 6 states
- Promote the participants' interests through cooperation (public and private sectors)
  - Develop networks and relations
  - Carry out collective actions
  - Support and promote regional initiatives
  - Carry out research projects
  - Heighten public awareness

R40-3, A lever to ecological connectivity CNEG-ECP

Opening session of the 41st CNEG-ECP, August 2017

Striking achievements

- 1984: Establishment of the Environment Committee
- 1988: Adoption of an initial action plan on acid rain
- 2001: Adoption of the first intergovernmental action plan on climate change
- 2005: The Climate Group granted the Low Carbon Leaders of the Decade award to the CNEG-ECP
- 2009: The region attained its first greenhouse gas emission reduction target (return to 1990 levels by 2010)
- 2009: Recognition of hydroelectricity as a clean, renewable energy source
- 2013: The Climate Group granted the Leadership Award to the CNEG-ECP
- 2017: Addition of a B2B linkage program at the annual conference

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CNEG-ECP

NEG ECP
GN-A PMEC

40th Annual Conference of New England Governors and Eastern Canadian Premiers - Boston Massachusetts 2016

40e Conférence annuelle des gouverneurs de la Nouvelle-Angleterre et des premiers ministres de l'Est du Canada

RESOLUTION 40-3

RESOLUTION ON ECOLOGICAL CONNECTIVITY,
ADAPTATION TO CLIMATE CHANGE, AND BIODIVERSITY CONSERVATION

Adopted on August 29, 2016

R40-3, A lever to ecological connectivity

What is Ecological Connectivity?

« The degree to which similar facets of the landscape such as habitats or vegetation patches are interconnected to facilitate movements of plants, animals, and the attendant ecological processes »

R40-3, A lever to ecological connectivity
Ecological connectivity

Why it's important?

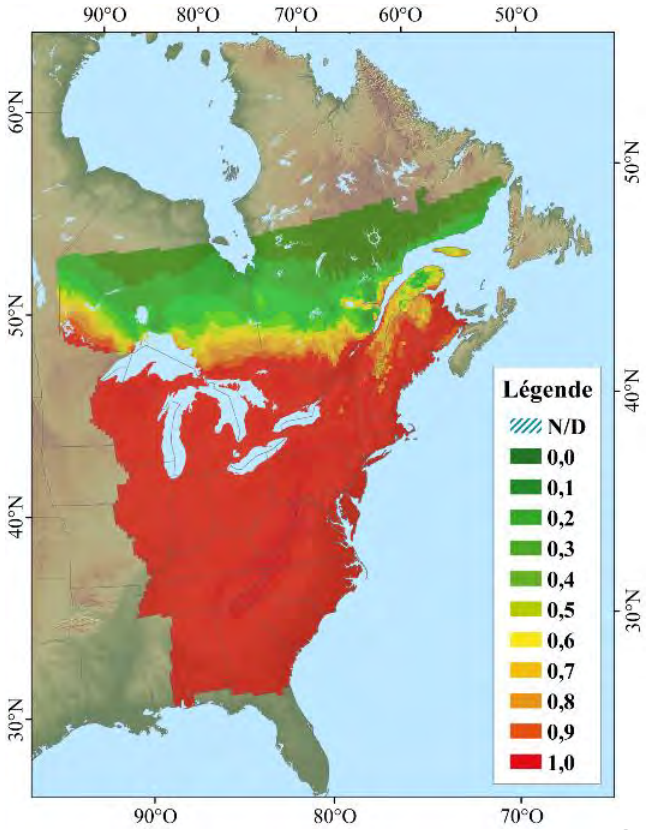
To meet species habitat requirements, for population dynamics, for maintaining ecological processes

Fragmentation : an issue for both terrestrial and aquatic ecosystems

R40-3, A lever to ecological connectivity
Ecological connectivity

A specific challenge against a backdrop of climate change

- Observation: the environment will quickly change …
- Species options: adapt or relocate
- Increase connectivity = one of the main recommendations for biodiversity conservation in the context of climate change



R40-3, A lever to ecological connectivity
Resolution: Its content

Recognizes the challenges of maintaining a connected landscape

- « Maintaining and restoring ecological connectivity is an important strategy for boosting the resilience of the region's native ecosystems »
- « Connected habitats provide the natural pathways necessary for fish, wildlife and plants to move to meet their life needs and to find suitable habitats as climate conditions change »

R40-3, A lever to ecological connectivity
Resolution: Its content

Recognizes the challenges posed by connectivity

- « Transportation infrastructure can be designed and sited to ensure habitat connectivity … significant public safety, economic and climate resiliency benefits to communities »
- « Effective action requires collaboration across borders »

R40-3, A lever to ecological connectivity

Resolution: A call to collaborate throughout the region

R40-3, A lever to ecological connectivity
Resolution: The engagements

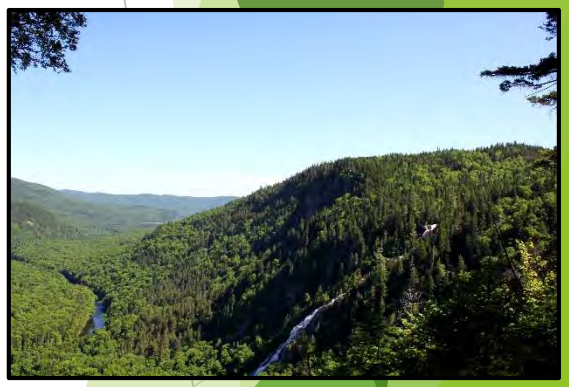
Conservation

- « instruct agencies within their jurisdictions to elevate ecological connectivity …to encourage regional collaboration »
- « advise agencies within their jurisdictions to support land protection and planning efforts that maintain and improve connectivity»
- « to collaborate, where possible, to document the current state of forest and habitat connectedness… »
- « to pursue collective efforts to control the invasion of exotic species and the spread of wildlife diseases… to protect the region's biodiversity and preserve the health »

R40-3, A lever to ecological connectivity
Resolution: The engagements

Planning

« Encourage land-use planning bodies at all levels, especially in the municipalities, to include objectives respecting habitat connectivity in their land-use planning policies »



Development

« Promote the sustainable management of public and private lands and aquatic systems that protect or enhance connectivity »

R40-3, A lever to ecological connectivity
Resolution: The engagements

Transportation

- « instruct transportation and natural resource agencies to explore opportunities to develop, modify and expand federal, provincial and state programs to enhance transportation in order to improve habitat connectivity »
- « Collaborate in efforts to determine sound design and proper size of transportation infrastructure to enable species to move about and facilitate adaptation to the anticipated changes in precipitation and peak flow stemming from climate change »

R40-3, A lever to ecological connectivity
Resolution: Implementation

Working Group

- Co-Chair by Vermont and Québec
- Each jurisdiction represented by Wildlife agencies
- Final Implementation plan due 2020

R40-3, A lever to ecological connectivity

Working group for the Implementation of the Resolution 40-3

Accomplishments since 2017

- Developed Working Group administrative structure (e.g., terms of reference)
- Working group meetings (Sept. 2017, June 2018, April 2019) and regular conference calls
- Interim report and draft implementation plan (summer 2018)
- Focusing on assessing current science, sharing information, and creating framework for long-term collaboration

Goals, Objectives and Actions

Goal 1 - Regional and local coordination

At the regional level (Northeast jurisdictions)

- Connectivity Working Group

At each jurisdiction level

Examples:

- Interdepartmental Committee
- Ecological corridors project of the Action-Climate program by NCC

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Working group for the Implementation of the Resolution 40-3

Goal 2 - Sharing information

Information sharing tools

- Development of a web platform (in progress)

Conferences and workshops

- Conference on road ecology and climate change adaptation (October 2017) - Quebec
- Northeastern Transportation and Wildlife Conference (sept. 2018) - Massachusetts
- The Canadian Maritimes Ecological Connectivity Forum (april 2019) - Nova Scotia

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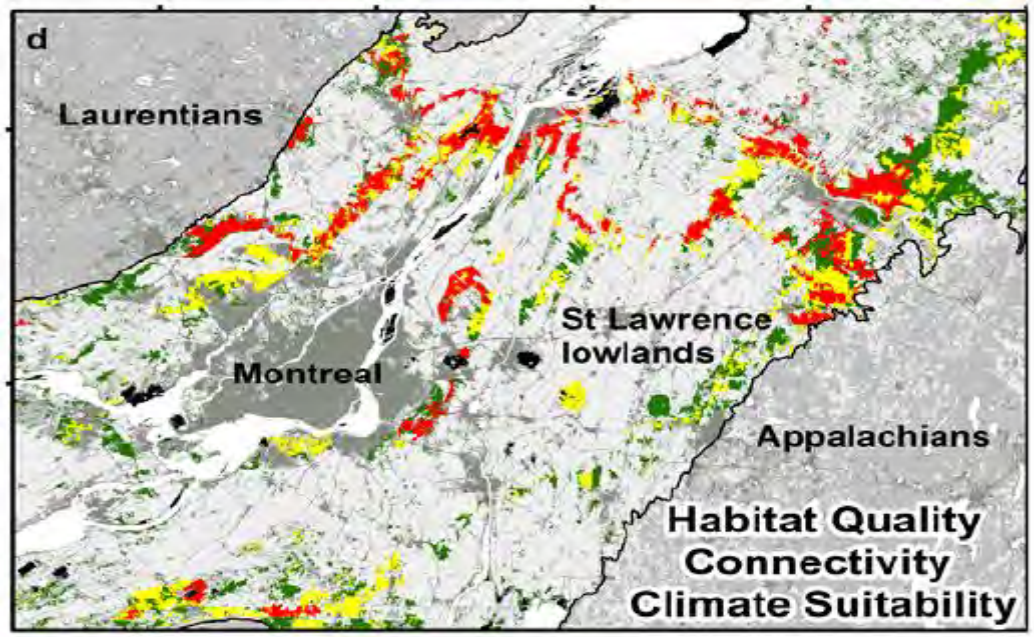
Working group for the Implementation of the Resolution 40-3

Goal 3 - Assessment of Current Science on Connectivity

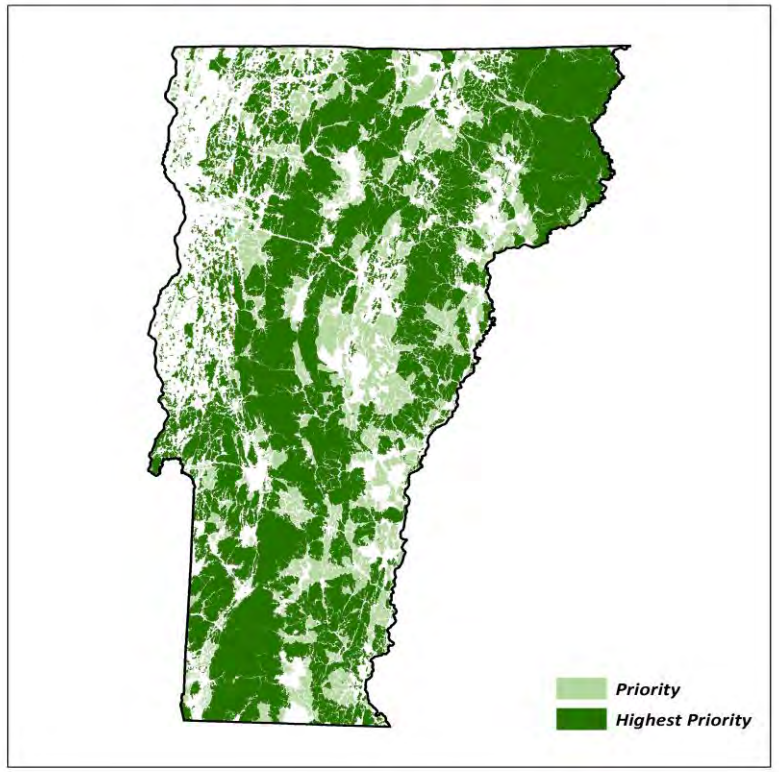
Jurisdiction Report on the Current State of Knowledge



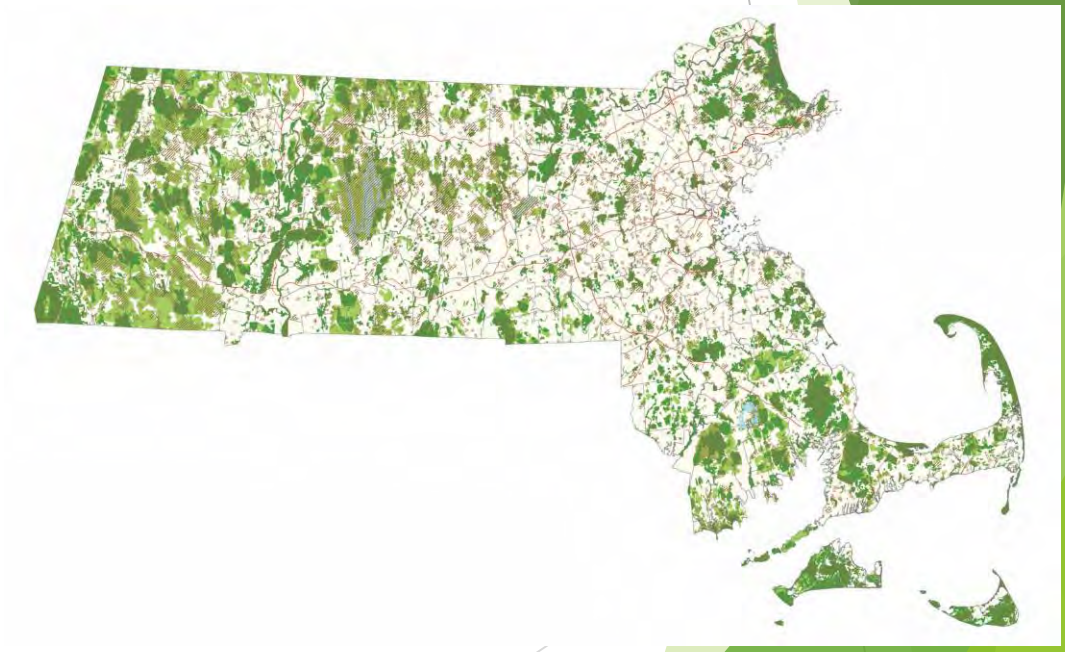
Albert et al. 2017

Landscape Scale Science

Vermont Conservation Design – Ecological Connectivity Analysis at the State-level



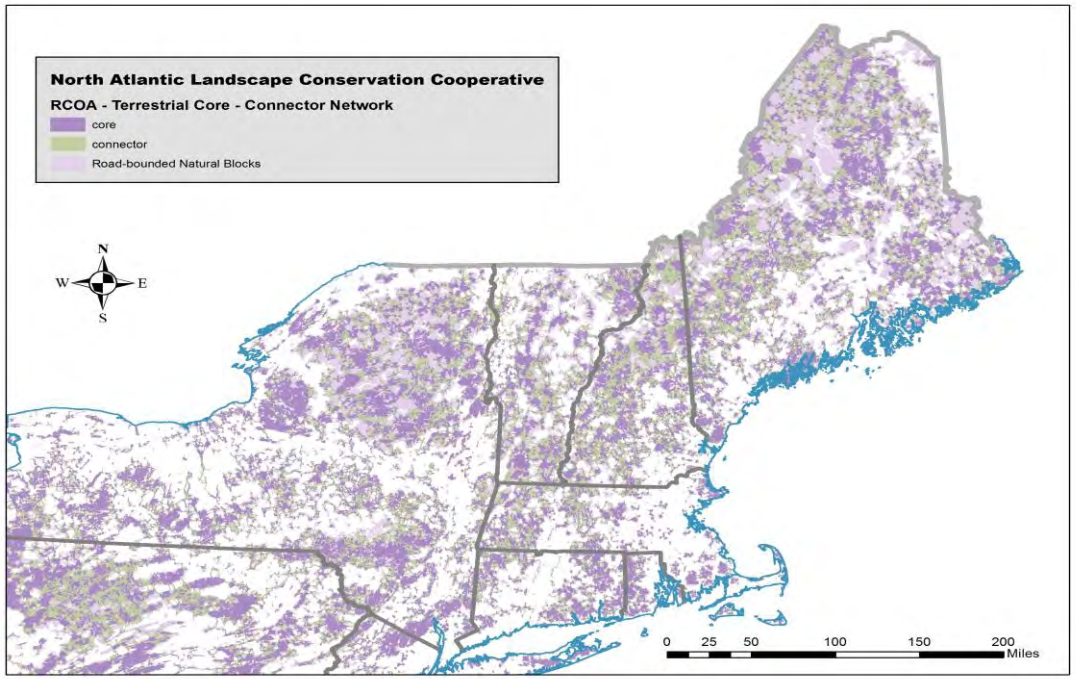
Massachussetts BioMap

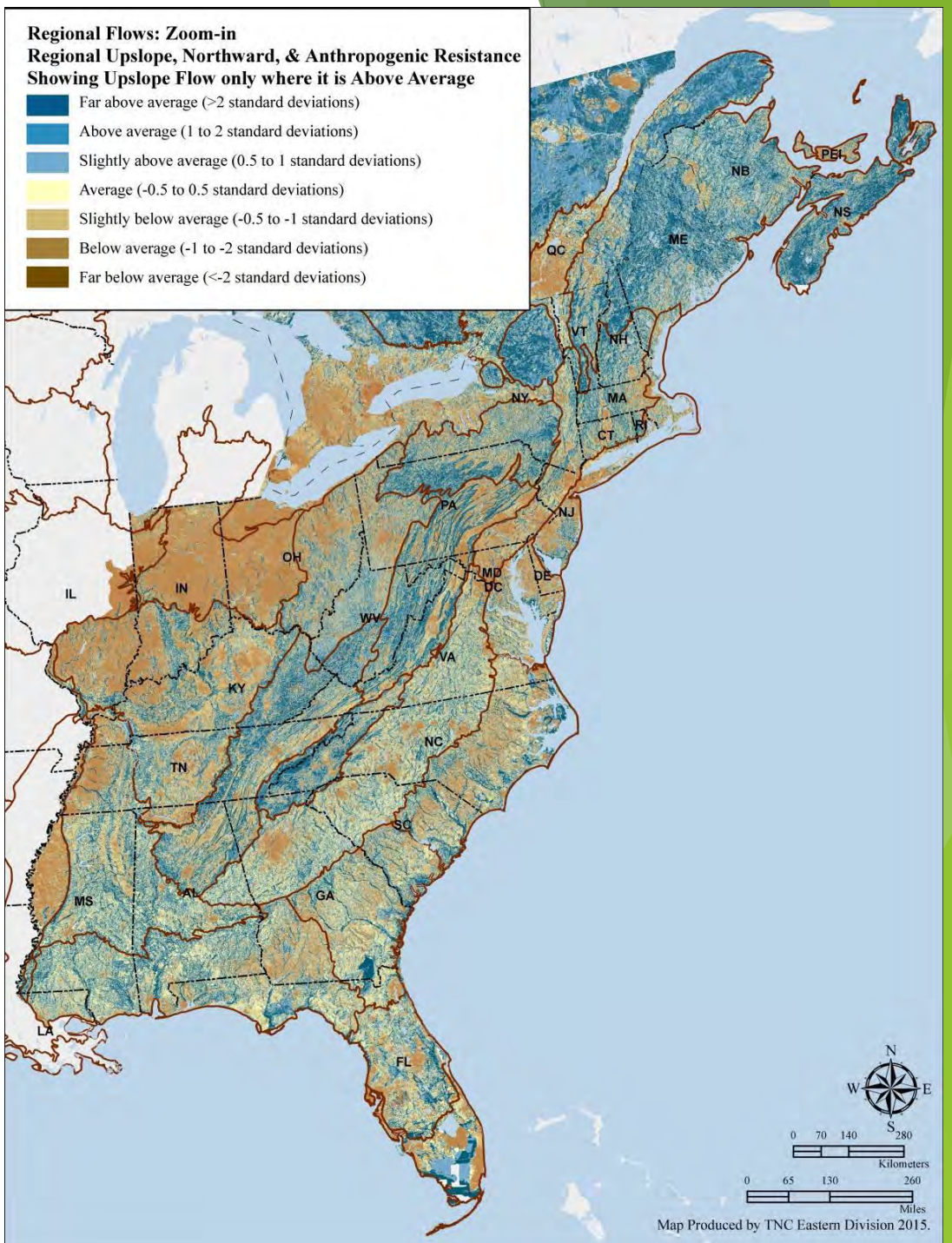


Regional Scale Connectivity Science

The Nature Conservancy

Resilient and Connected Landscapes for Terrestrial Conservation





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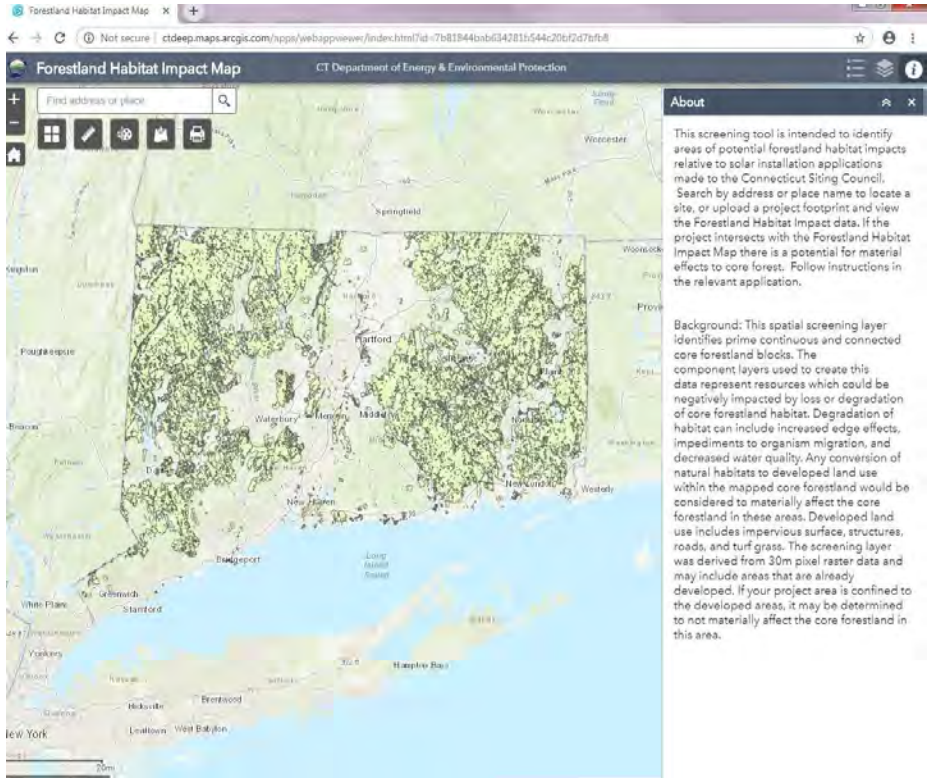
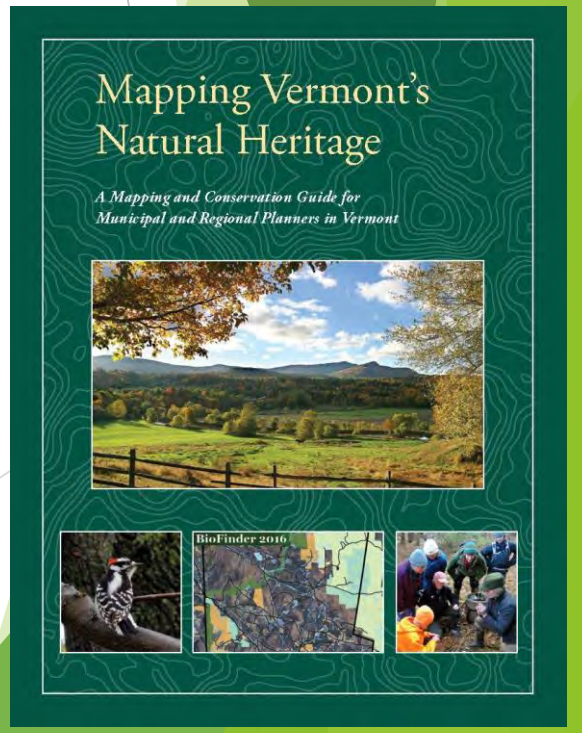
Working group for the Implementation of the Resolution 40-3

Goals 4 – Integrate connectivity strategies into land use planning

- Recognize different legal authority for each jurisdiction
- Opportunities for sharing information used to guide land use planning and regulation - Build consistency
- Base guidance on consistent science that illustrates the connected landscape
- Example - Act 171 in Vermont





R40-3, A lever to ecological connectivity
Working group for the Implementation of the Resolution 40-3

- Goal 7 – Land management and stewardship
  - In Quebec, government is working to integrate connectivity during forest planning in public forests (ecosystem management in spruce forests, work in progress for fir forests)
  - NH works with industrial forest landowners to maintain high elevation wildlife corridors in forest management plans

R40-3, A lever to ecological connectivity
Working group for the Implementation of the Resolution 40-3

Goal 5 - Transportation

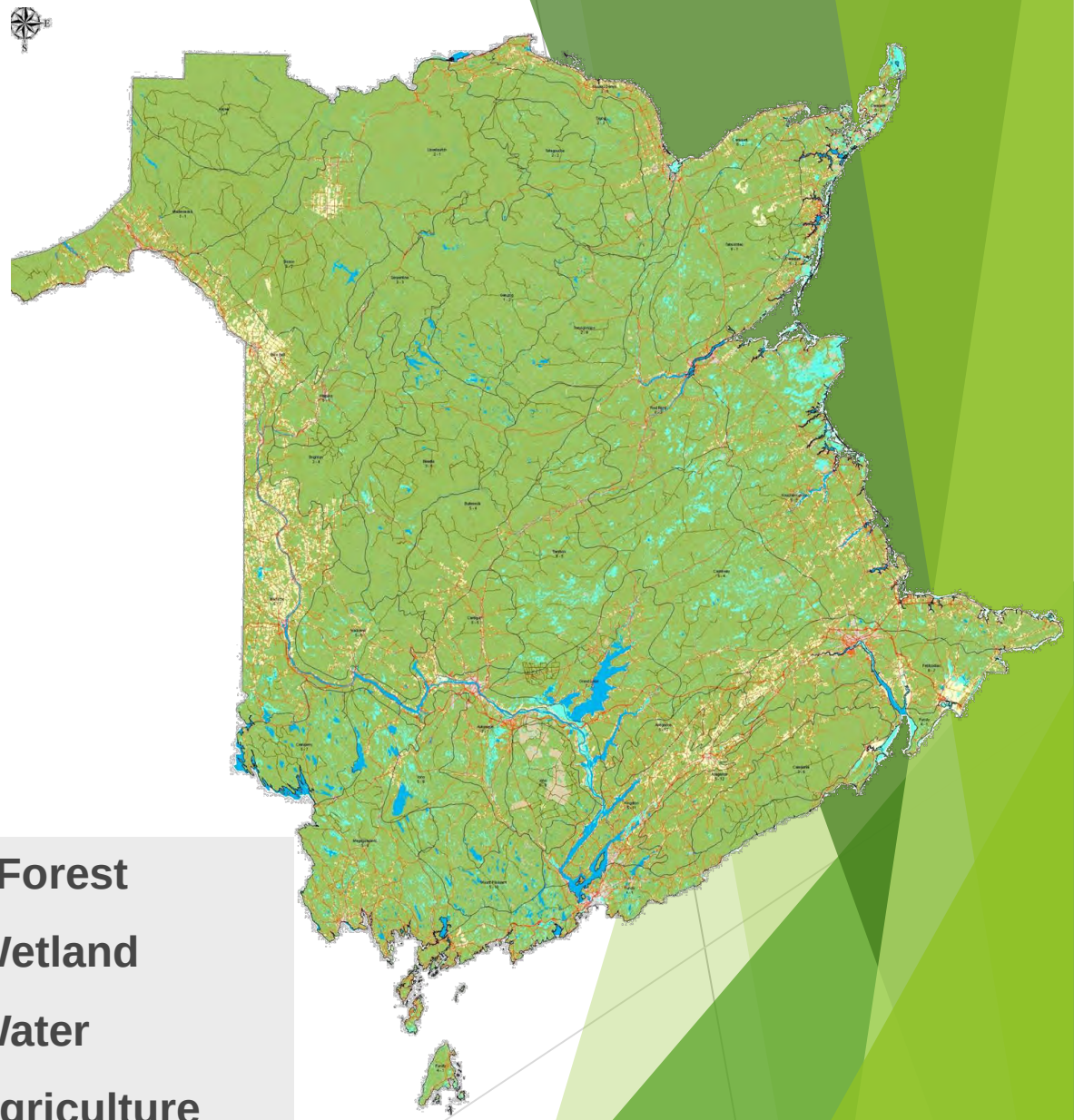
Establish mechanisms for collaboration between transportation and natural resource agencies

New Brunswick

- **<u>Protecting Connectivity Corridors</u>** - Chignecto Isthmus and 3-Boarders regions recognized as areas for focused efforts in NB proposal to **Pathway to Canada (Biodiversity) Target 1 (17% protected by 2020).**

- **<u>Science and Analysis</u>** - Nature Conservancy Canada (Atlantic Region) proposal to model ecological (structural) connectivity across New Brunswick to aid land-use decisions.

- **<u>Transportation and Infrastructure</u>** – Ongoing efforts to mitigate connectivity issues generated through fencing…



85% Forest

5% Wetland

2% Water

4% Agriculture

2% Urban & infrastructure

Massachusetts Department of Fish and Game
Division of Ecological Restoration
Invested in Nature and Community

Tidal Wetland Restoration
Muddy Creek
Route 28 road crossing replacement
Chatham/Harwich, Cape Cod, MA

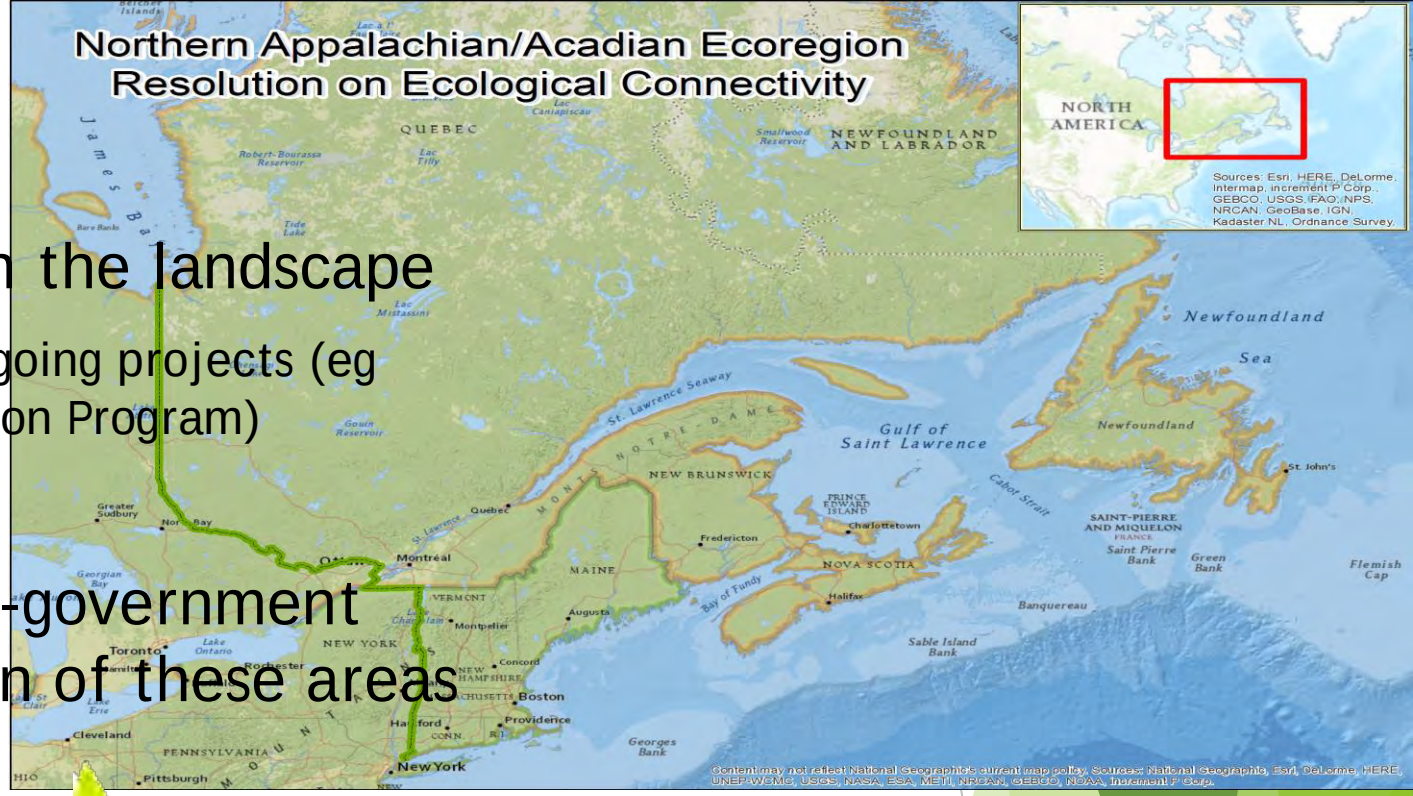
Pre-restoration

Post-restoration, 2016

Goal 6 - Land conservation

Identify priority connectivity areas on the landscape

- Based on Science established in Goal 3 and ongoing projects (eg "Climate Corridors" project of the Climate Action Program)



Collaboration of government and non-government organizations to promote conservation of these areas

Examples:

- Funding to support projects in connectivity

Fondation de la faune du Québec

- Consideration of Connectivity in Financing Programs for Land Acquisition and Restoration

R40-3, A lever to ecological connectivity
Key messages

1. Ecological connectivity is essential to the health of our regional environment and to enable effective adaptation to changing climatic conditions
2. Numerous conservation efforts offer opportunities to expand for greater success in the region
3. <u>Resolution 40-3 raises the bar with expectations for success</u>
   - Ensure collaboration, partnerships and information sharing
   - Establish a clear vision for a functional, ecologically connected landscape based on science
   - Promote a coordinated approach to conservation of the connected landscape among all jurisdictions

Resolution 40-3, A lever to ecological connectivity

Thank You!

Questions ?

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- John.Austin@vermont.gov