Nature Undivided- Connectivity Conservation

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CONNECTIVITY CONSERVATION Specialist Group

CENTER for LARGE LANDSCAPE CONSERVATION

REVIEW

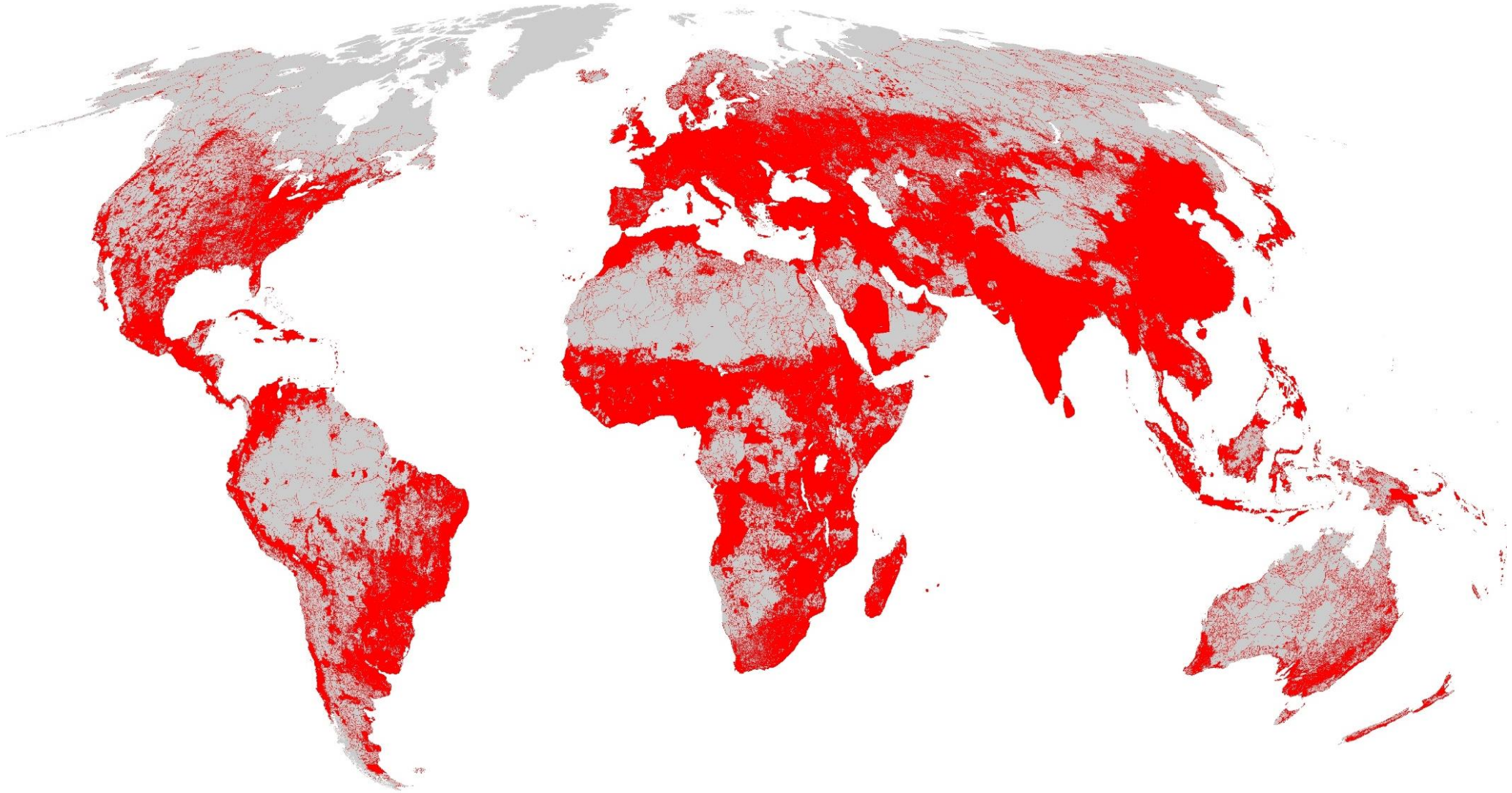
doi:10.1038/nature11018

Approaching a state shift in Earth's biosphere

Anthony D. Barnosky[1,2,3], Elizabeth A. Hadly[4], Jordi Bascompte[5], Eric L. Berlow[6], James H. Brown[7], Mikael Fortelius[8], Wayne M. Getz[9], John Harte[9,10], Alan Hastings[11], Pablo A. Marquet[12,13,14,15], Neo D. Martinez[16], Arne Mooers[17], Peter Roopnarine[18], Geerat Vermeij[19], John W. Williams[20], Rosemary Gillespie[9], Justin Kitzes[9], Charles Marshall[1,2], Nicholas Matzke[1], David P. Mindell[21], Eloy Revilla[22] & Adam B. Smith[23]

Localized ecological systems are known to shift abruptly and irreversibly from one state to another when they are forced across critical thresholds. Here we review evidence that the global ecosystem as a whole can react in the same way and is approaching a planetary-scale critical transition as a result of human influence. The plausibility of a planetary-scale 'tipping point' highlights the need to improve biological forecasting by detecting early warning signs of critical transitions on global as well as local scales, and by detecting feedbacks that promote such transitions. It is also necessary to address root causes of how humans are forcing biological changes.

More than 50% of the Planet
Now Human-Dominated Landscapes



Watson et al. 2016. ***Conservation Letters***

12 million km roads built since 2000 - 25 million km roads projected by 2050

Photo: Edward Burtynsky

835 TIMES AROUND THE EARTH, OR TO THE MOON AND BACK 43 TIMES

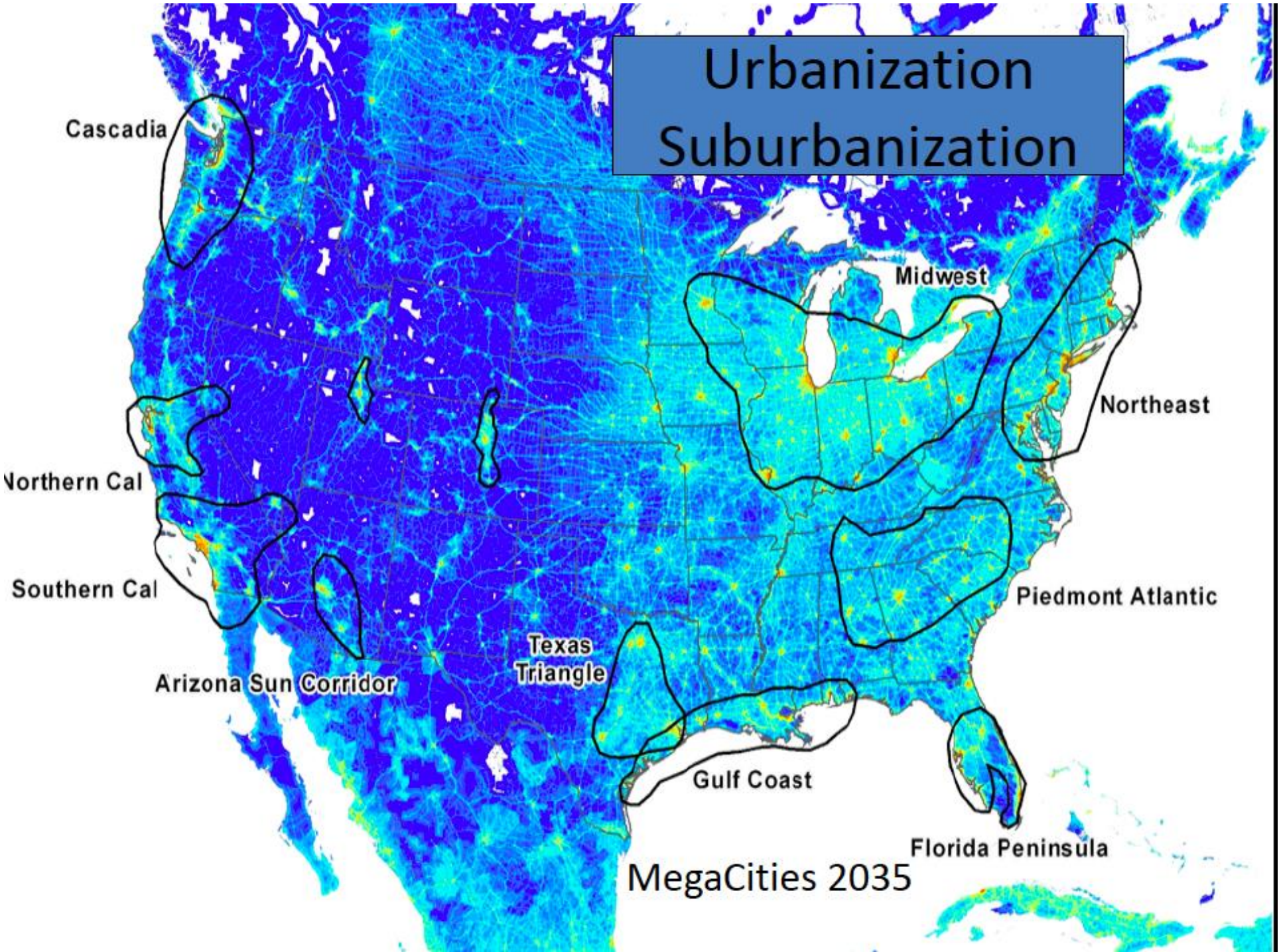
CIA. The World Factbook. www.cia.gov/library/publications/the-world-factbook/rankorder/2085rank.html

Over 100,000,000/year

Large Mammals Killed in Wildlife Vehicle Collisions/year

jochen.jaeger@concordia.ca

Rytwinski, Trina, et al. "How effective is road mitigation at reducing road-kill? A meta-analysis." PLoS one 11.11 (2016): e0166941.

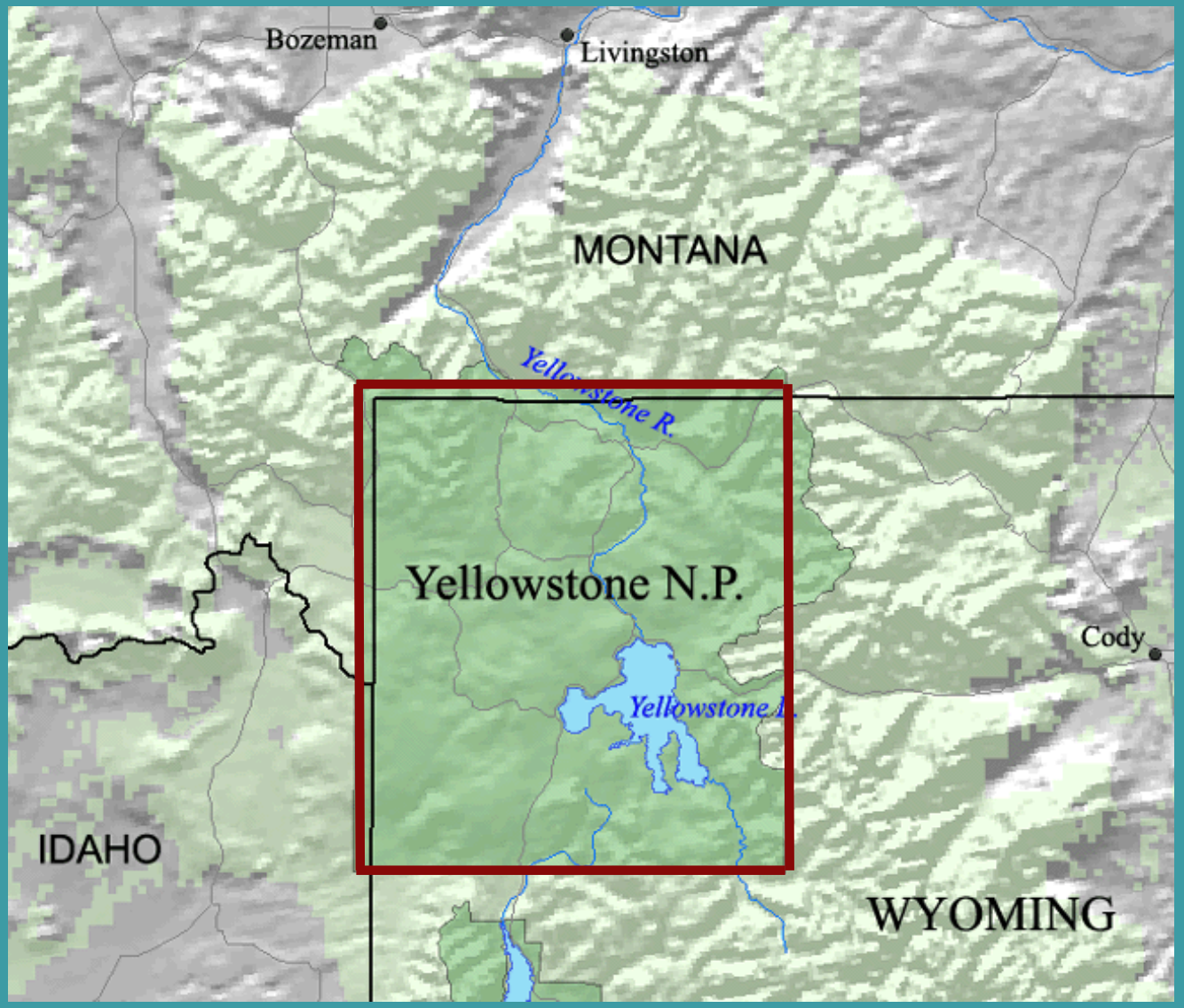

Urbanization
Suburbanization
Cascadia
Midwest
Northeast
Northern Cal
Southern Cal
Piedmont Atlantic
Texas
Triangle
Arizona Sun Corridor
Gulf Coast
Florida Peninsula
MegaCities 2035

America's Greatest Idea – National Parks

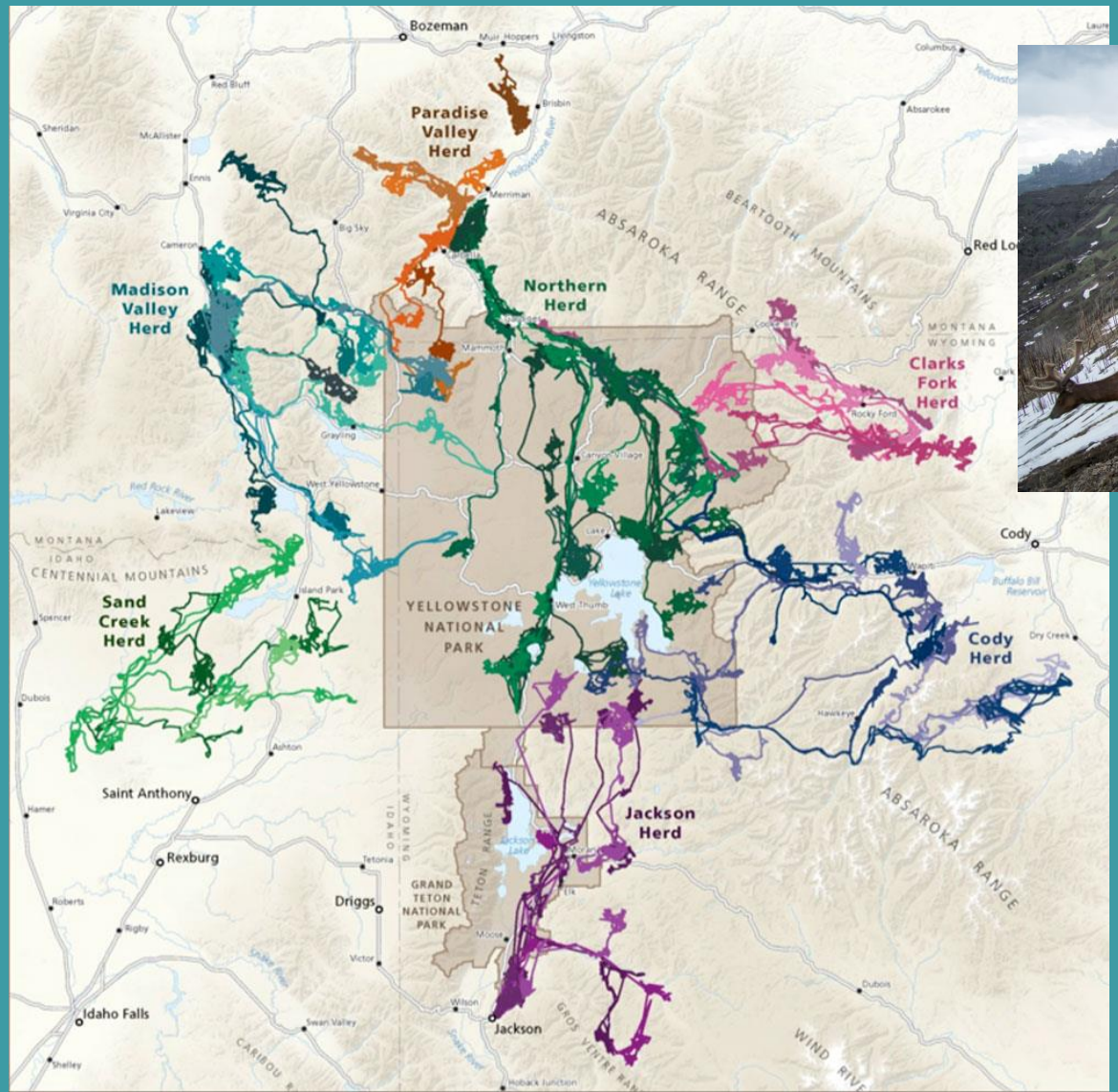
Thinking Outside the Box

1872 Solution For Conservation

Yellowstone National Park



Elk Migration in the Greater Yellowstone Ecosystem



National Geographic Society
Wyoming Migration Initiative
Photo courtesy: Joe Riis

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IUCN WCPA WORLD COMMISSION ON PROTECTED AREAS

CONNECTIVITY CONSERVATION Specialist Group

Emergence of Connectivity Conservation Practice

- 19th Century – National Park
- 20th Century – Ecosystem Conservation
- 21st Century – Process Conservation

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Process Conservation

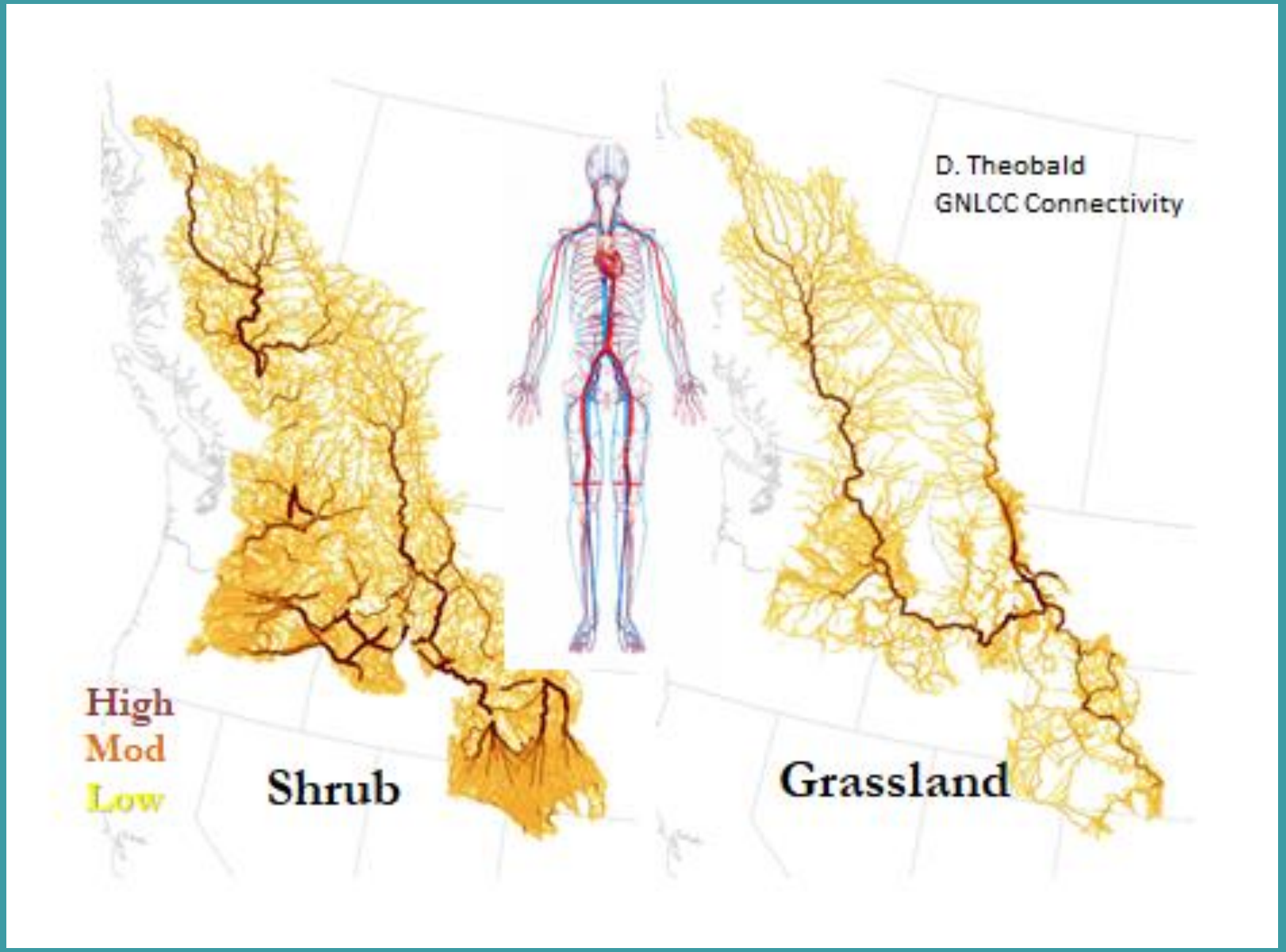
- Wildlife corridors
- Natural Disturbance Regimes
- Fire Ecology
- Hydrology
- Water Catchment
- Migration
- Dispersal
- Pollination
- Resilience

WHAT is Connectivity Conservation?

Connectivity Conservation

Conserves the ecological flows and dynamic processes that sustains nature and thus, benefits all life on Earth including people.

Connectivity =
Circulatory System of Nature



Connected Landscape Structure = Higher Levels of Ecological Function

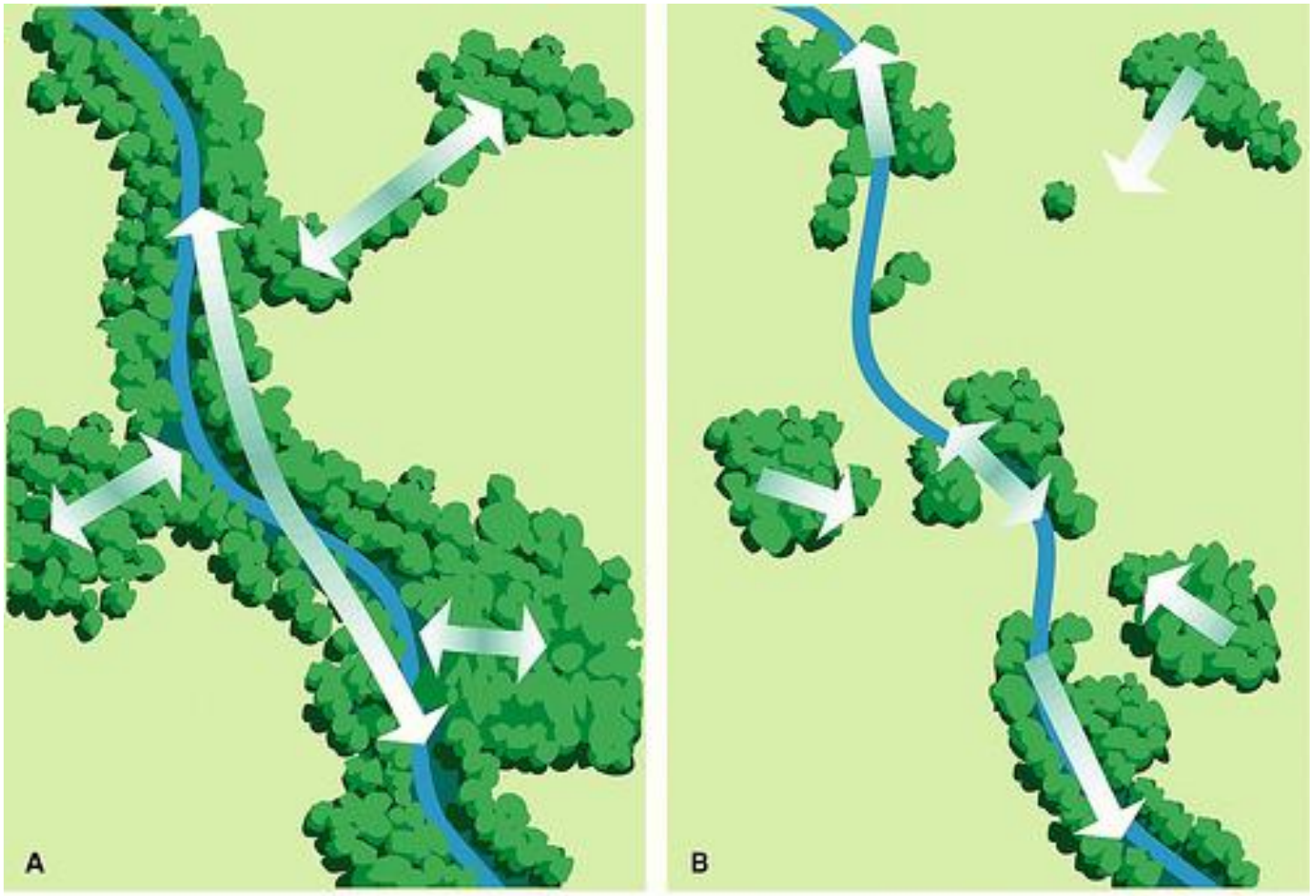


Fig. 2.38 -- Landscapes with (A) high and (B) low degrees of connectivity. A connected landscape structure generally has higher levels of functions than a fragmented landscape.
In Stream Corridor Restoration: Principles, Processes, and Practices (10/98)
by the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the U.S.)

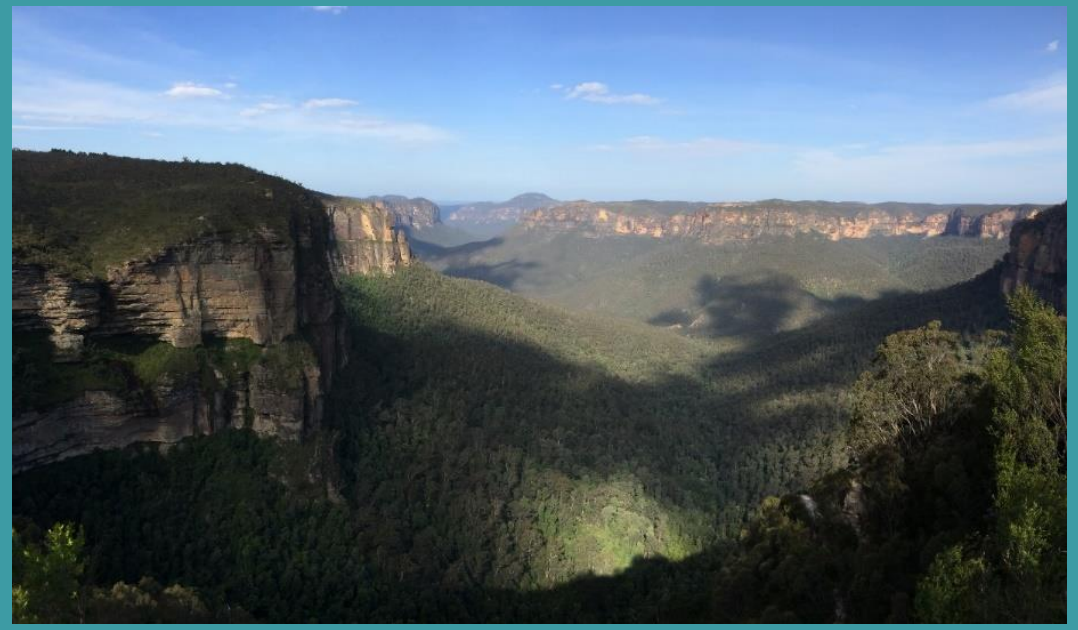
Connectivity =
Climate Change Adaptation

e.g., Heller and Zavaleta. 2009. Conservation Biology, 142, 14-32.

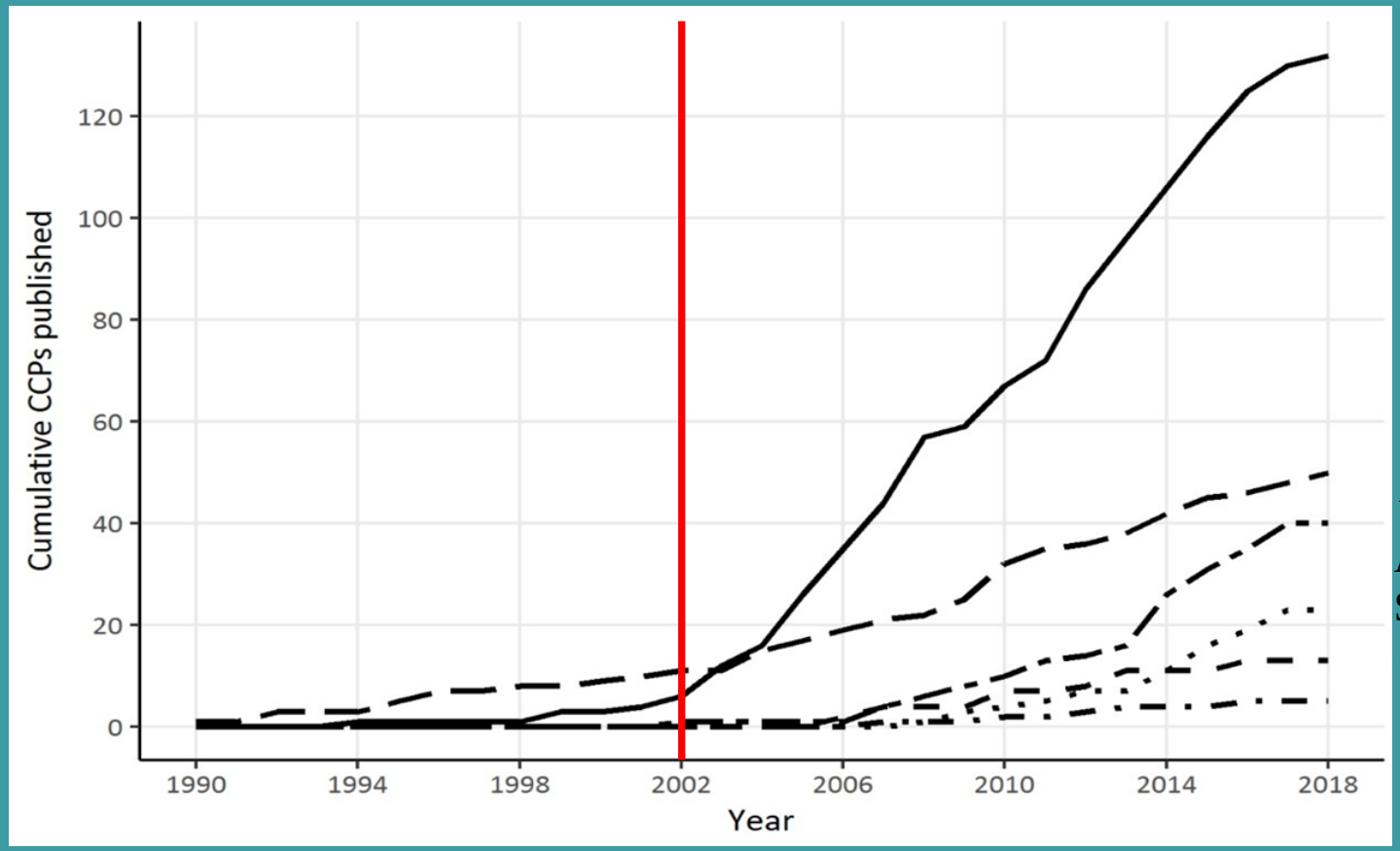
Global Assessment of 550 Connectivity Plans (effective n=263)

WHAT is Connectivity Conservation?
There are different terms and practices used around the world!

- Areas of connectivity conservation
- Biological corridors
- Climate corridors
- Conservation lands networks
- Conservation management networks
- Linkage zones
- Permeability areas
- Territorial systems of ecological stability
- Marine protected area networks
- Transboundary conservation areas
- Wildlife corridors



Thirty years of connectivity conservation planning: an assessment of factors influencing plan implementation



North America (led by NGOs & US states, not federal gov't)

Europe

Africa (mostly RSA)

Asia

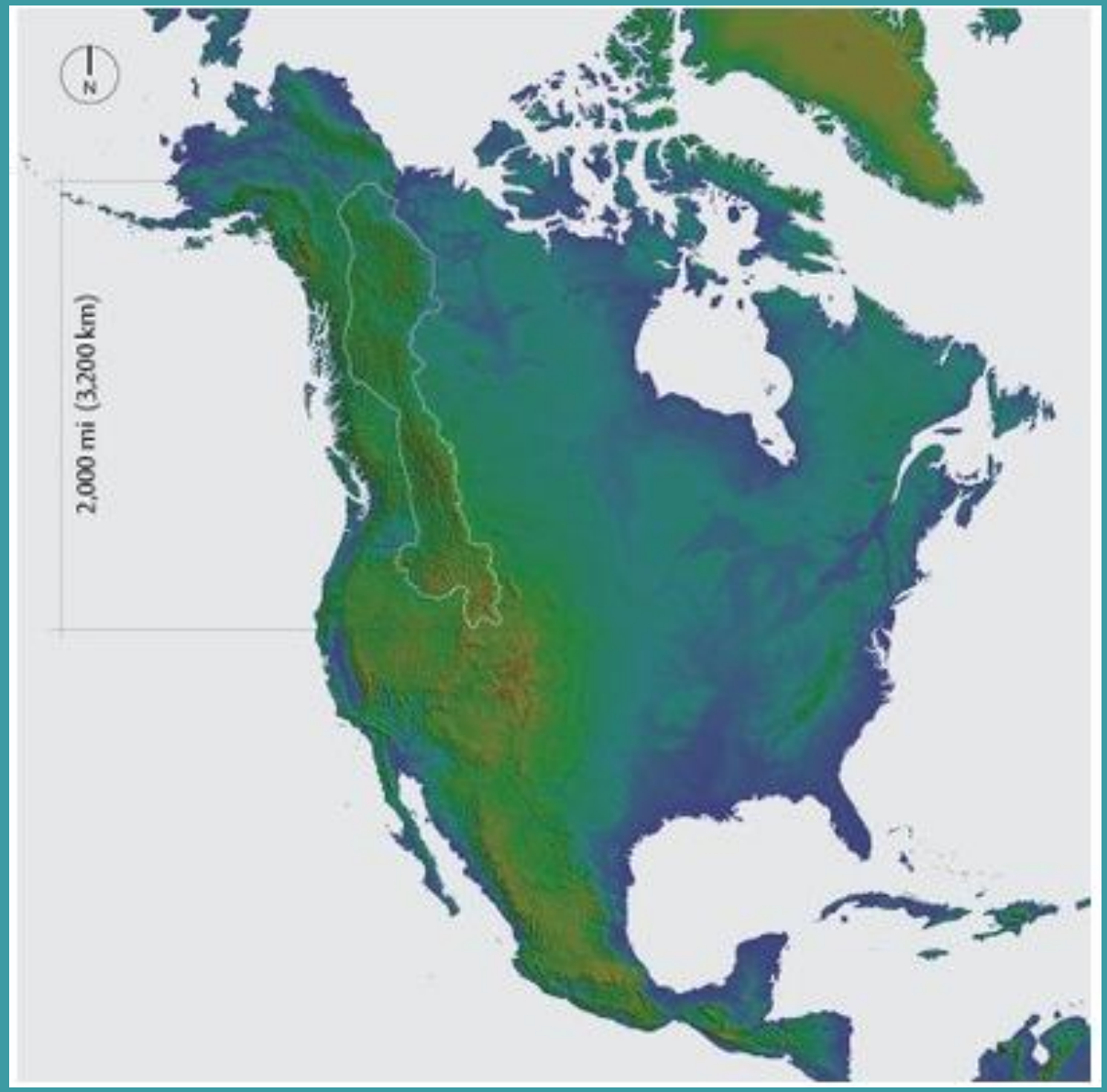
South America

Oceania

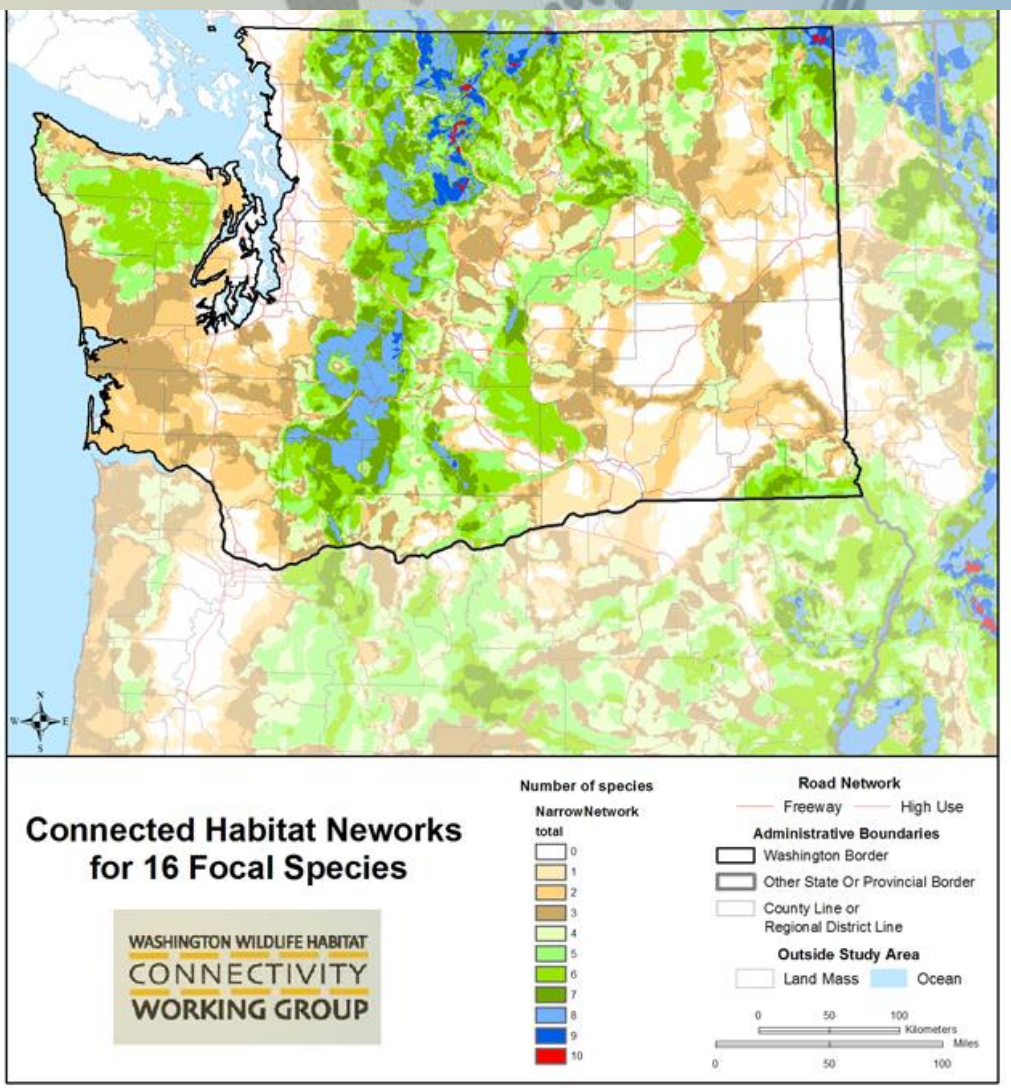
Authors: Keeley, Beier, Creech, Jones, Jongman, Stonecipher, and Tabor

Environmental Research Letters – Oct 1 2019

Y2Y: The Geography of Hope

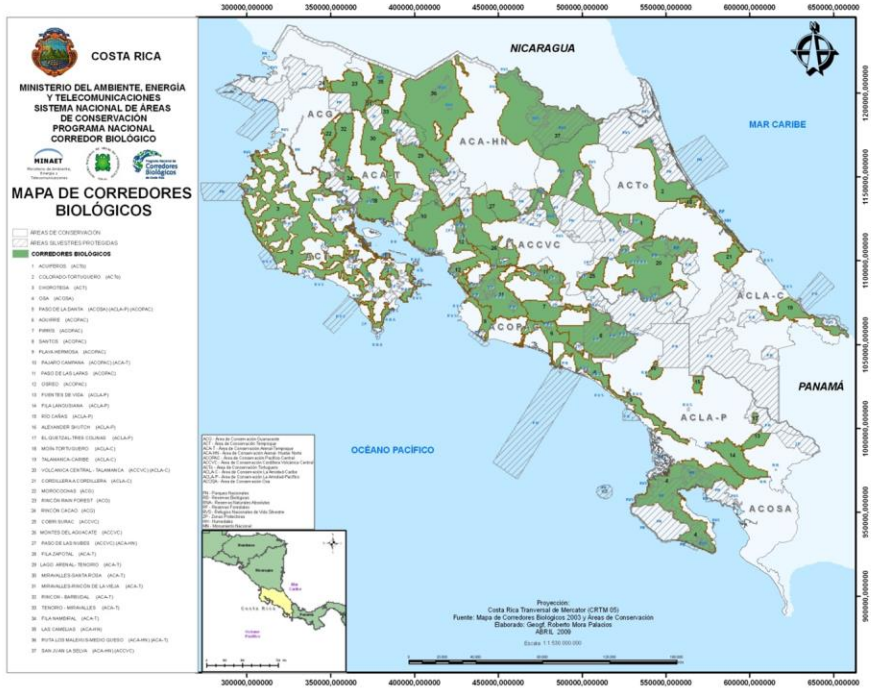


WASHINGTON WILDLIFE HABITAT
CONNECTIVITY
WORKING GROUP

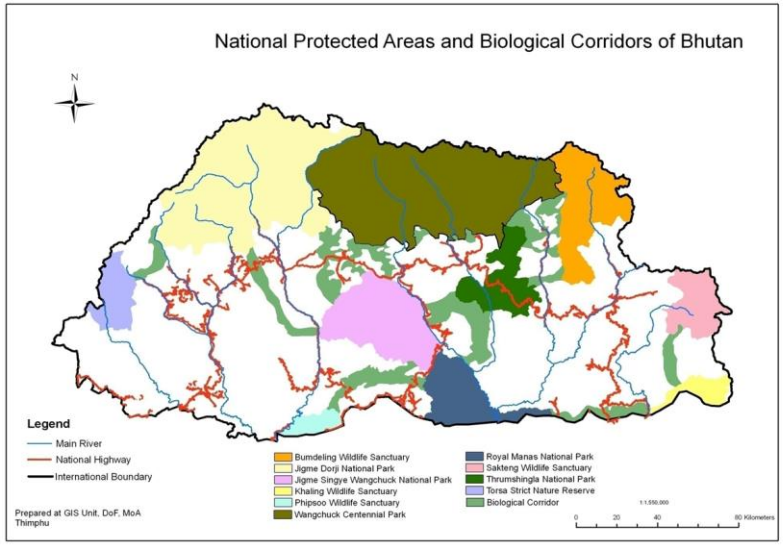


This map shows the connected habitat networks, which are composed of Habitat Concentration Areas (HCAs) and linkages that connect them, for sixteen focal species. Color

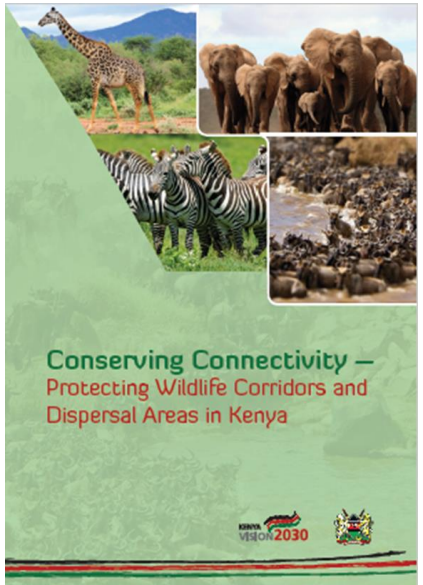
National Policy



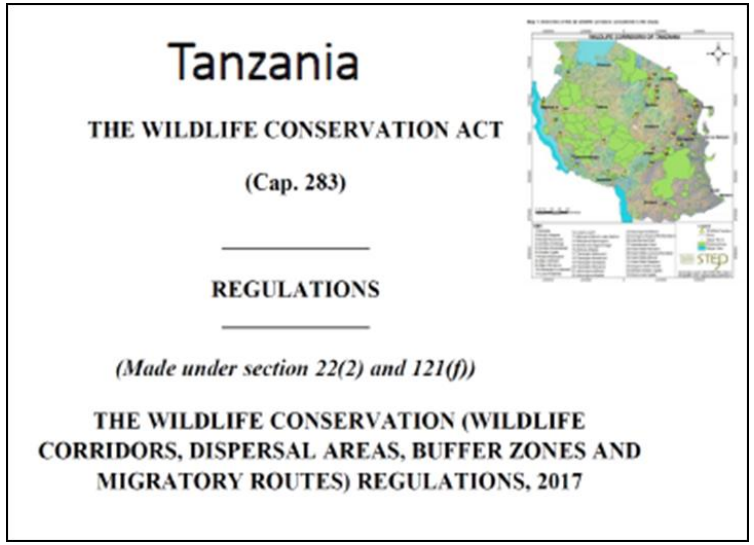
Costa Rica



Bhutan



Kenya



Proposed USA Legislative

115TH CONGRESS
2D SESSION

H. R. 7232

To establish a National Wildlife Corridors Program to provide for the protection and restoration of certain native fish, wildlife, and plant species, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

DECEMBER 10, 2018

Mr. BEYER introduced the following bill; which was referred to the Comm
on Natural Resources, and in addition to the Committees on Armed S
ices, Agriculture, and Transportation and Infrastructure, for a perio
be subsequently determined by the Speaker, in each case for cons
ation of such provisions as fall within the jurisdiction of the comm
concerned

A BILL

To establish a National Wildlife Corridors Program to p
vide for the protection and restoration of certain na
fish, wildlife, and plant species, and for other purpos

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Wildlife Corridors Conservation Act of 2018".

(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

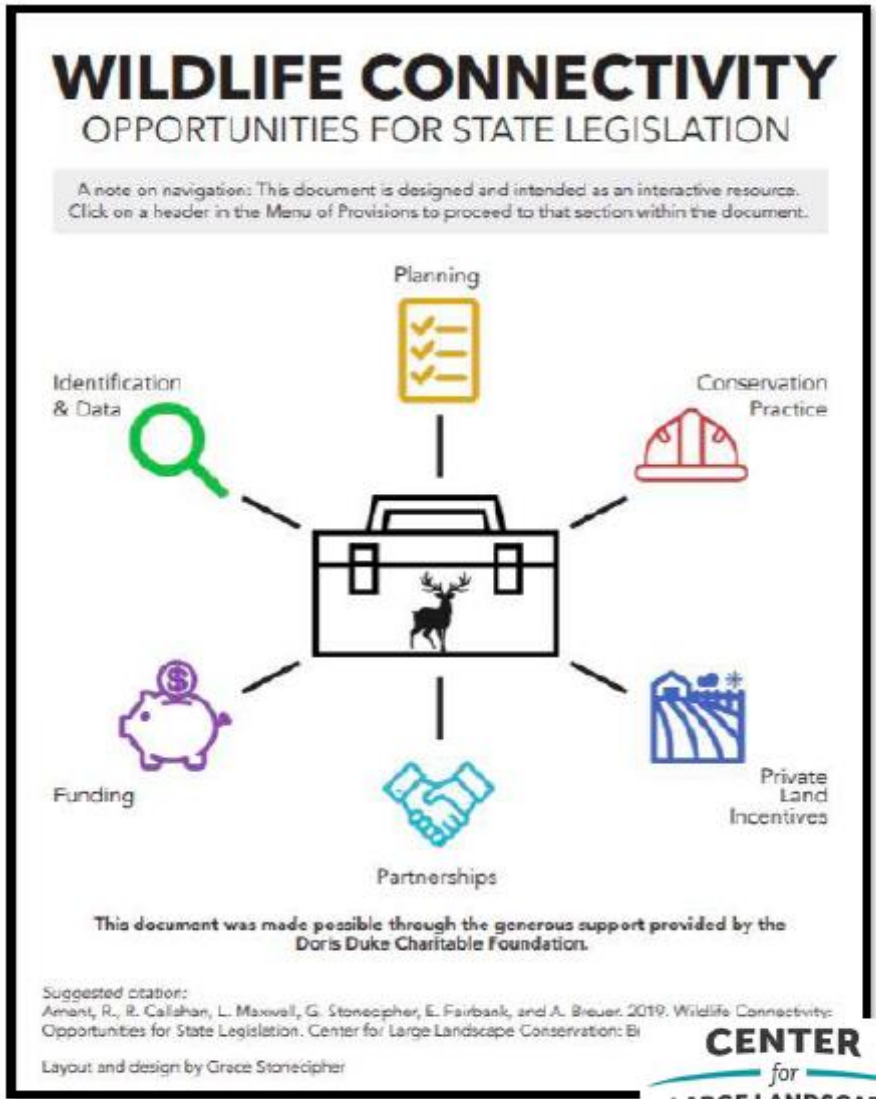
A BILL

To establish a National Wildlife Corridors Program to provide for the protection and restoration of certain native fish, wildlife, and plant species, and for other purposes.

https://www.congress.gov/115/bills/hr7232/BILLS-115hr7232ih.pdf

State Connectivity Policy

- **California (Legislative)**
- **Colorado (Administrative)**
- Maine
- Mississippi
- Nevada
- **New Hampshire (Legislative)**
- **New Mexico (Legislative)**
- **Oregon (Legislative)**
- Pennsylvania
- Vermont
- Virginia
- Washington
- **Wyoming (Administrative)**



Wildlands NETWORK

NCEL National Caucus of Environmental Legislators

ENDANGERED SPECIES COALITION

CENTER for LARGE LANDSCAPE CONSERVATION

New England Governors and Eastern Canadian Premiers

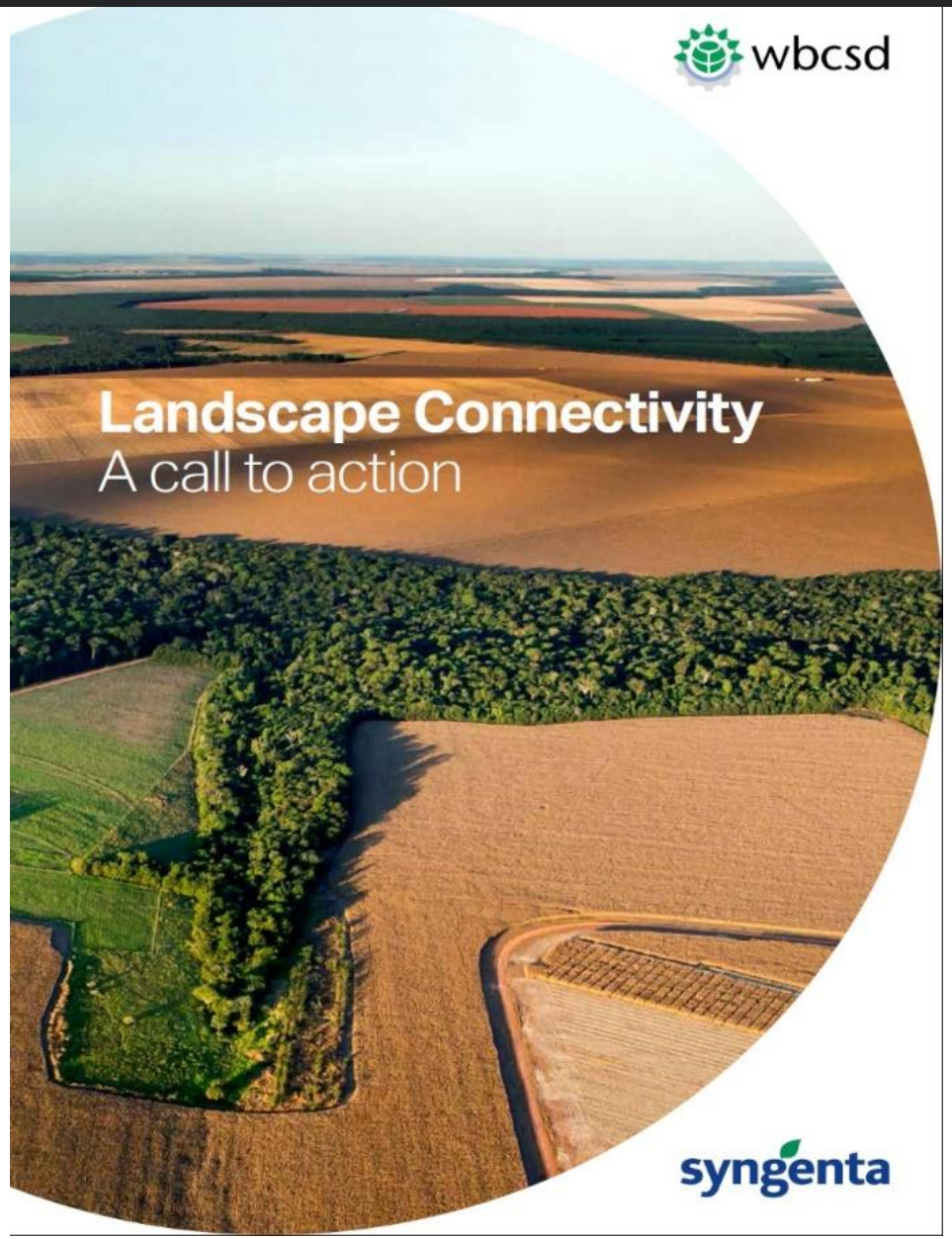
Resolution 40-3
Resolution on Ecological Connectivity,
Adaptation to Climate Change and Biodiversity Conservation

2018 -Secretarial Order 3362
Secretary Zinke Prioritizes Conservation & Big Game Migration Corridors
Elk, Mule Deer, Bighorn Sheep

Signs Order Directing More Resources Toward Habitat Restoration, Conservation, Collaboration and Research

Theodore Roosevelt Conservation Partnership

PEW



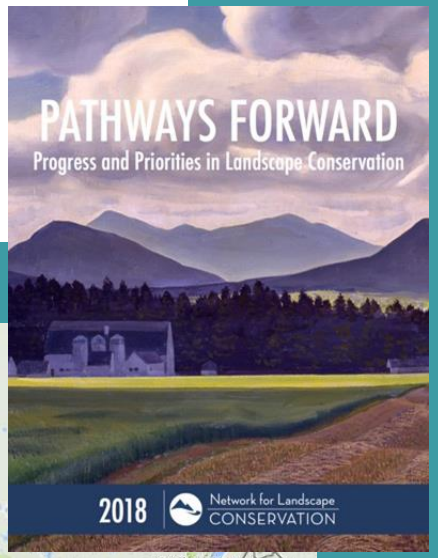
World Business Council
for Sustainable Development

World Business Council for Sustainable Development

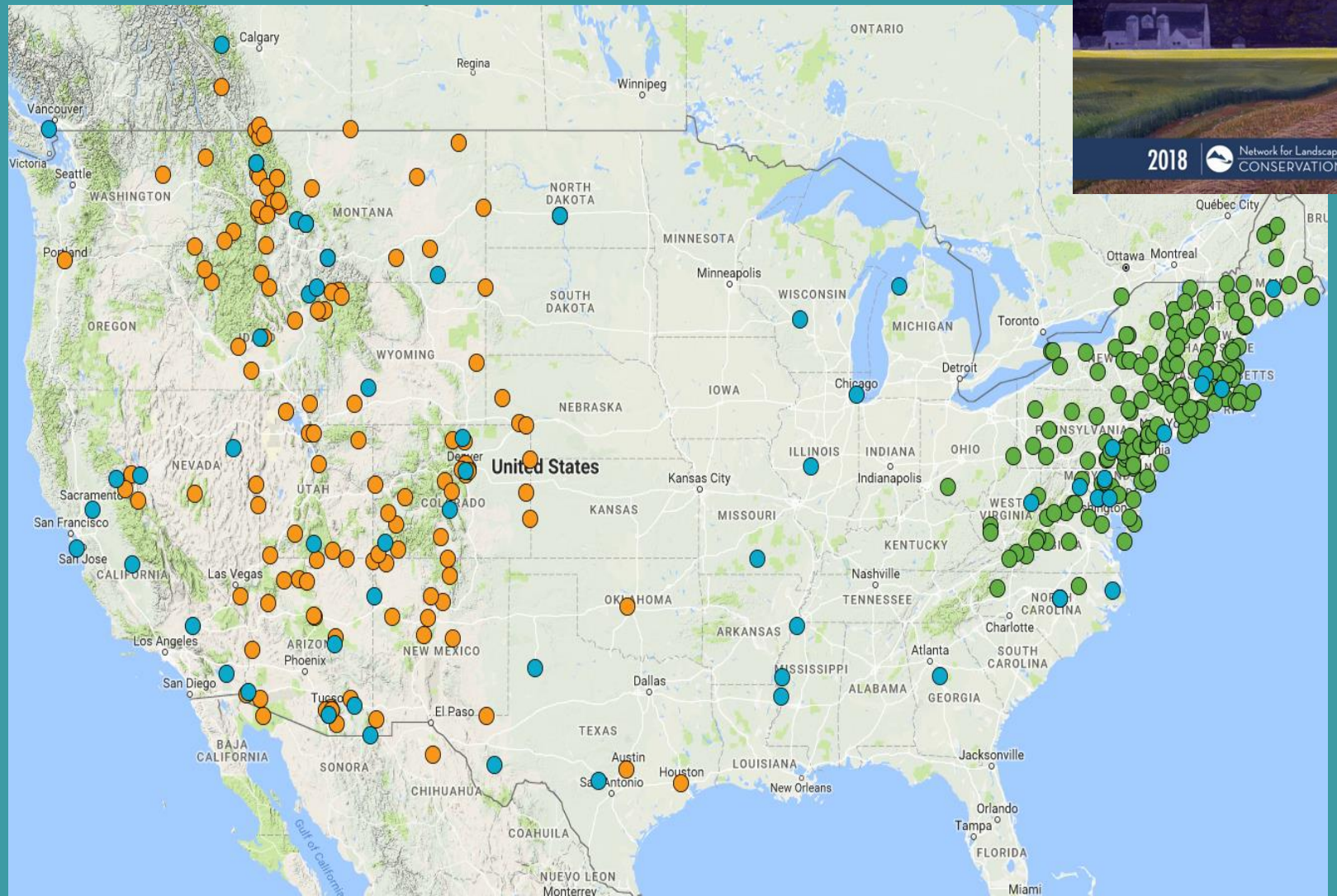
A CEO-led coalition of some 200 international companies (35 countries, 22 sectors) with a shared commitment to sustainable

Network for Landscape CONSERVATION

Advancing the Practice of Conservation at the Landscape Scale



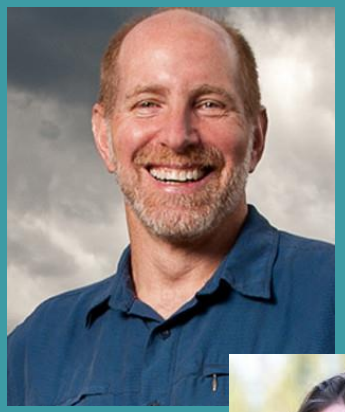
http://landscapeconservation.org/



IUCN WCPA
WORLD COMMISSION
ON PROTECTED AREAS

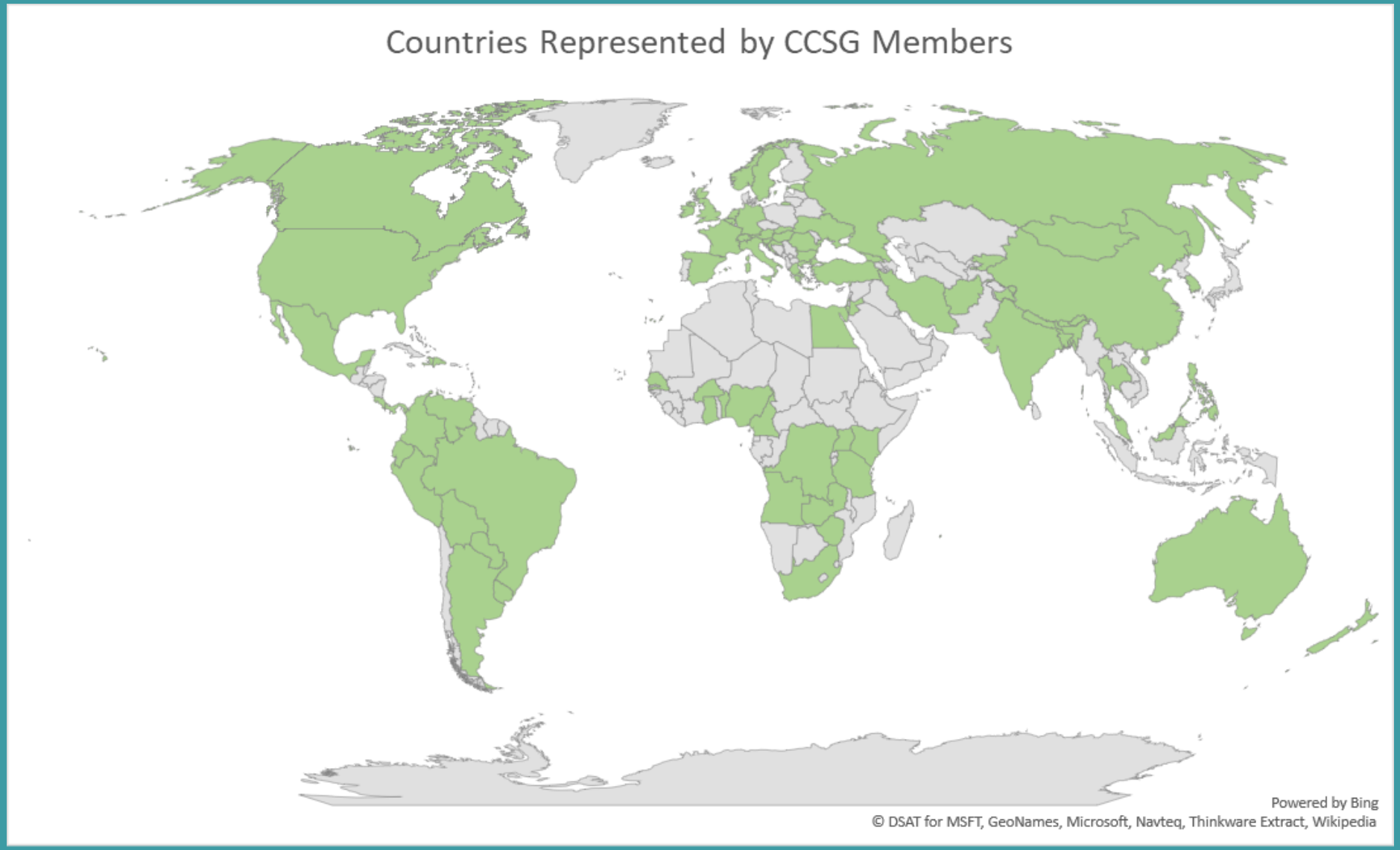
Connectivity Conservation Specialist Group (CCSG)

- Established 2016
- **Chair: Gary Tabor, CLLC**
- **Vice Chair: Jodi Hilty, Y2Y**



- Developing consistent practices, promoting evidence-based learning, advancing policy and innovation, enhancing mitigations response, building a global constituency for connectivity, connecting people to connect nature
- Volunteer network of 800+ members in 80+ countries
- Experts from government, science, academia, non-profit, and business

800 Members in 80+ Countries



WHAT is needed?

Global guidance for large-scale conservation!

(Draft) IUCN guidance for
"Safeguarding Ecological Corridors in the Context of Ecological Networks for Conservation"

IUCN WCPA WORLD COMMISSION ON PROTECTED AREAS CONNECTIVITY CONSERVATION

Begins 1 July 2019

Deadline 30 September 2019

GLOBAL ONLINE CONSULTATION

(Draft) ***Guidance for safeguarding ecological corridors in the context of ecological networks for conservation***

Review of this Consultation Draft

Who:
On behalf of the IUCN World Commission on Protected Areas (WCPA), the Connectivity Conservation Specialist Group (CCSG) is fielding input from *individuals and institutions* to improve the (Draft) ***Guidance for Safeguarding ecological corridors in the context of ecological networks for conservation***.

What and why:
There is now a large and growing body of scientific literature on biological, ecological, and applied research related to connectivity conservation and how it functions for biodiversity and ecosystem maintenance. IUCN has been working for over two decades to incorporate these scientific underpinnings into more coherent large-scale conservation measures that conserve, restore, and complement protected and conserved areas (aka OECMs). The 2016 IUCN World Conservation Congress, by adopting Resolution 2016-087, invited IUCN Members and governments to focus attention on an advanced draft of existing guidelines for connectivity conservation, and to work toward further development, designation, planning, and management of connectivity areas and expanded networks.

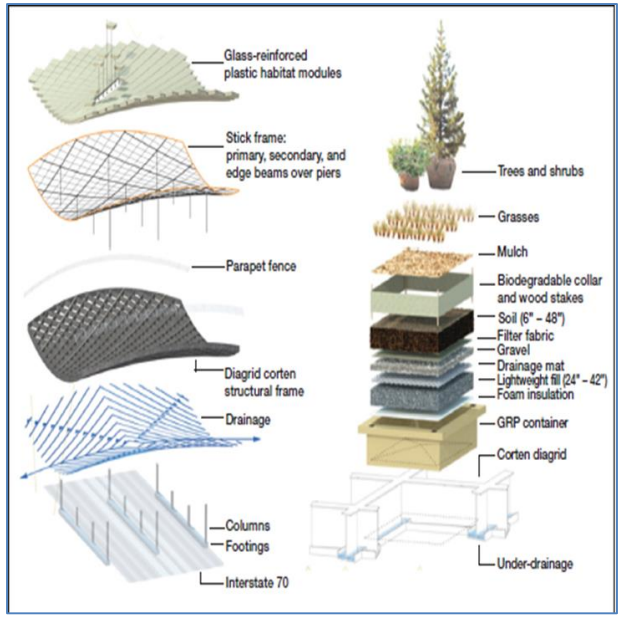
Efforts to establish these consistent global approaches for connectivity conservation has progressed well since 2016. Based on the advanced draft, a series of consultations was held around the world in 2017 under the auspices of the CCSG. Based on feedback from the consultations, collaboration among a core group of lead authors and experts throughout 2018 and early 2019 resulted in this revised draft that seeks to clarify and standardize approaches for protecting the physical spaces that connect protected and conserved areas, enhance

Yellowstone to Yukon Conservation Initiative

CENTER for LARGE LANDSCAPE CONSERVATION

Transport Working Group

Greener Road, Rail, Canal Designs



Connectivity Conservation Workshop: Guiding the Carpathian Region

Alpin Resort, Poiana Brasov (Romania)
4-7 November 2019

Jointly organized by BearConnect Project, the Center for Large Landscape Conservation, and the IUCN WCPA Connectivity Conservation Specialist Group