Nature Undivided

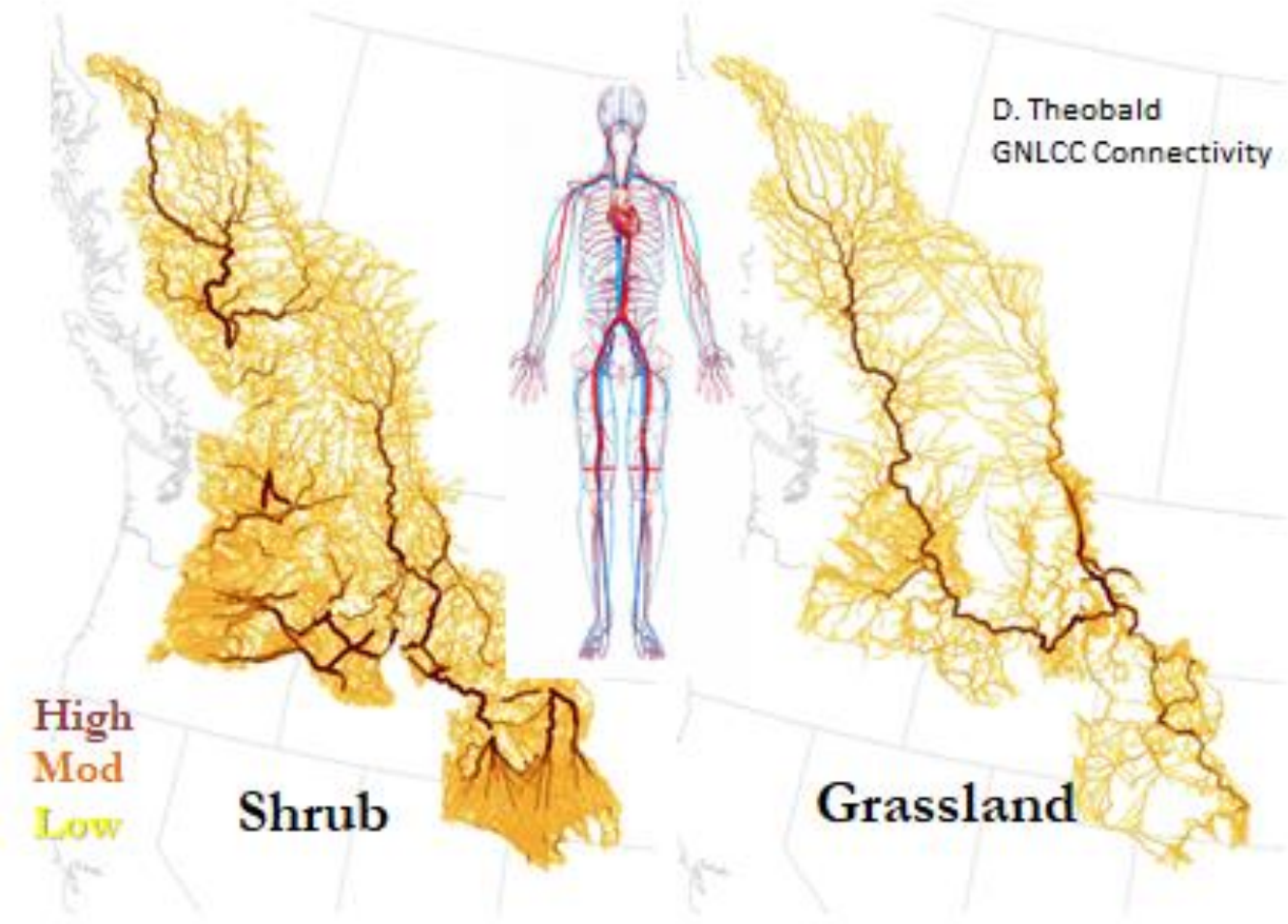
Presented by Katie Deuel, M.S., MSW
Senior Conservation Director
Center for Large Landscape Conservation

For CMP Forum: Indigenous Leadership in Honoring and Caring for the Earth

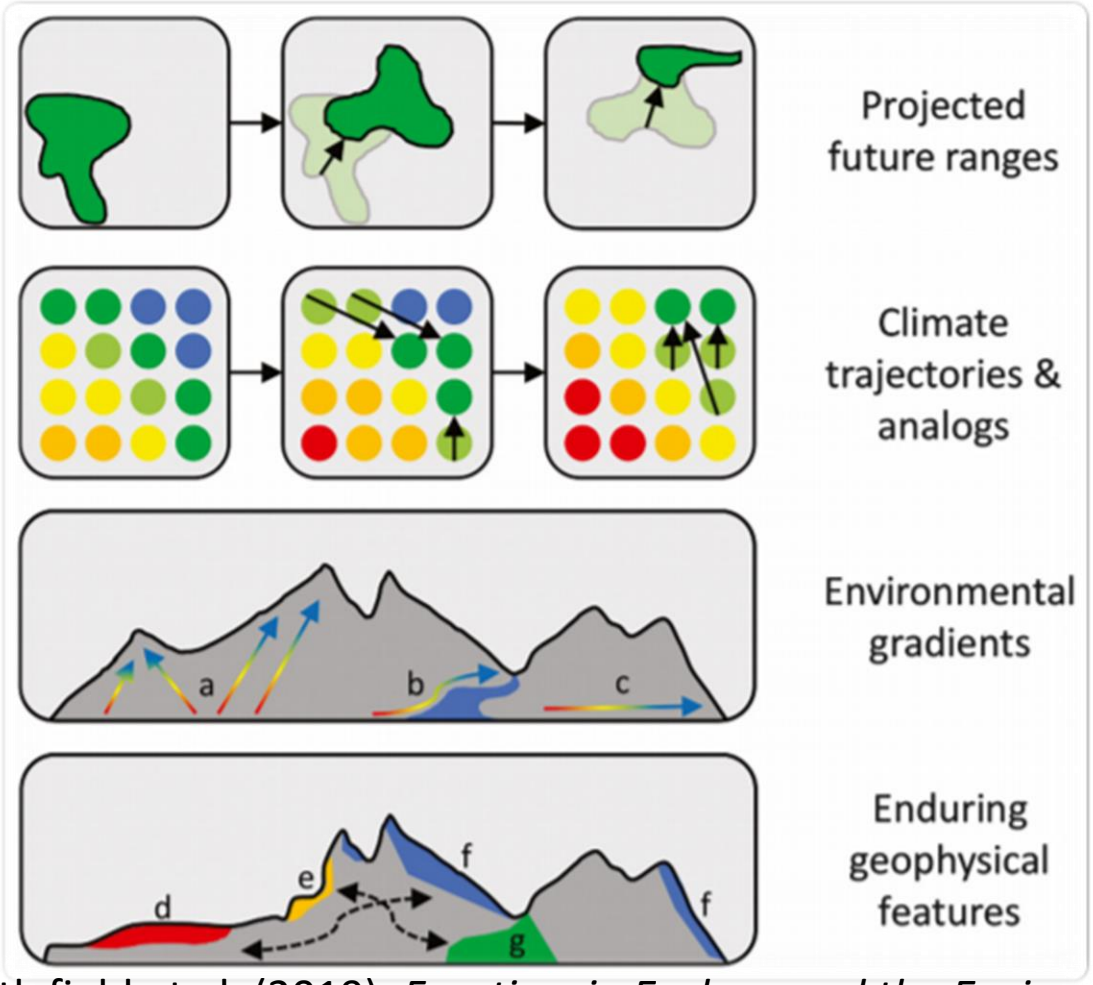
CENTER for LARGE LANDSCAPE CONSERVATION

IUCN WCPA WORLD COMMISSION ON PROTECTED AREAS CONNECTIVITY CONSERVATION Specialist Group

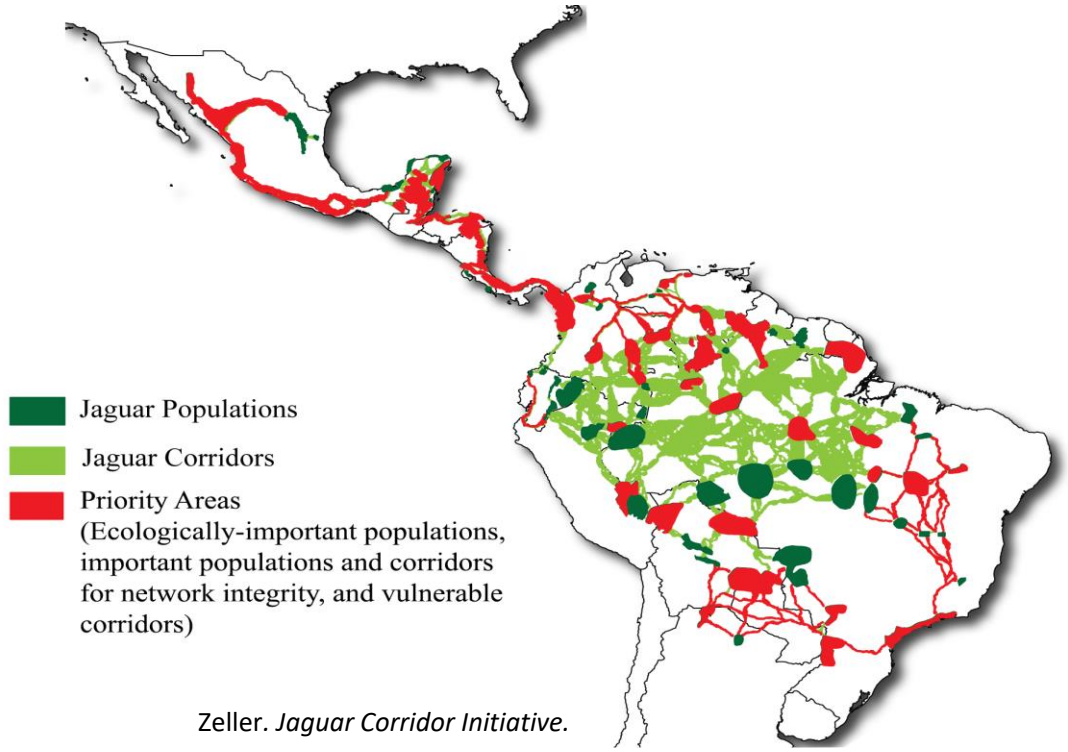
Connectivity = Circulatory System of Nature



CLIMATE CHANGE: IMPLICATIONS FOR DESIGNING AND CONSERVING ECOLOGICAL NETWORKS



Littlefield et al. (2019). *Frontiers in Ecology and the Environment.*



Zeller. *Jaguar Corridor Initiative.*

ANIMALS REACT TO CLIMATE CHANGE IN THREE WAYS:

1. Move
2. Adapt
3. Die

America's original conservation ideal – National Parks

1872 solution for conservation

Yellowstone National Park

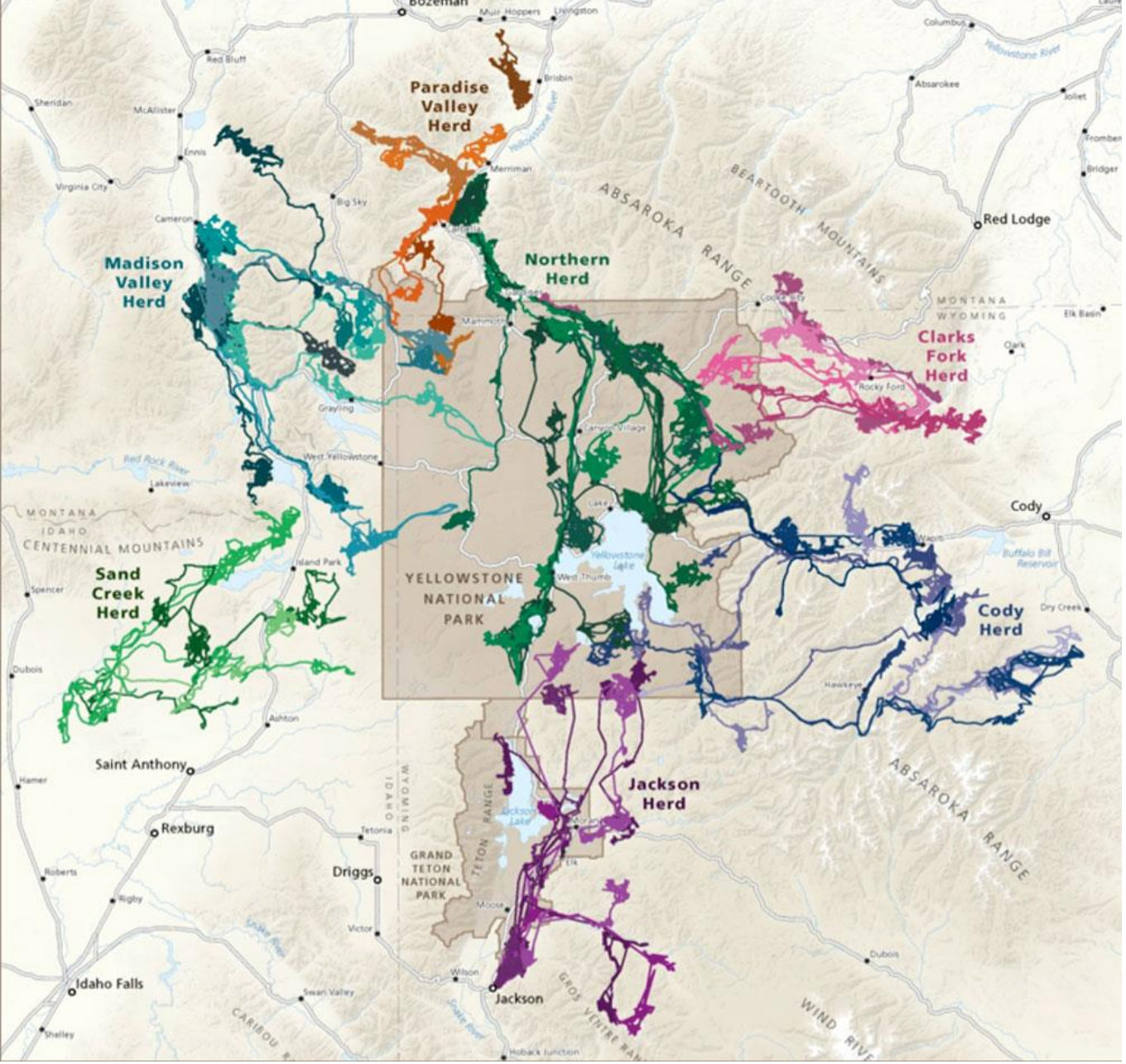
(3,471 sq miles)

Think outside the box…

Emergence of Connectivity Conservation Practice

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

Elk Migration in the Greater Yellowstone Ecosystem



National Geographic Society
Wyoming Migration Initiative
Photo courtesy: Joe Riis

Process Conservation

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

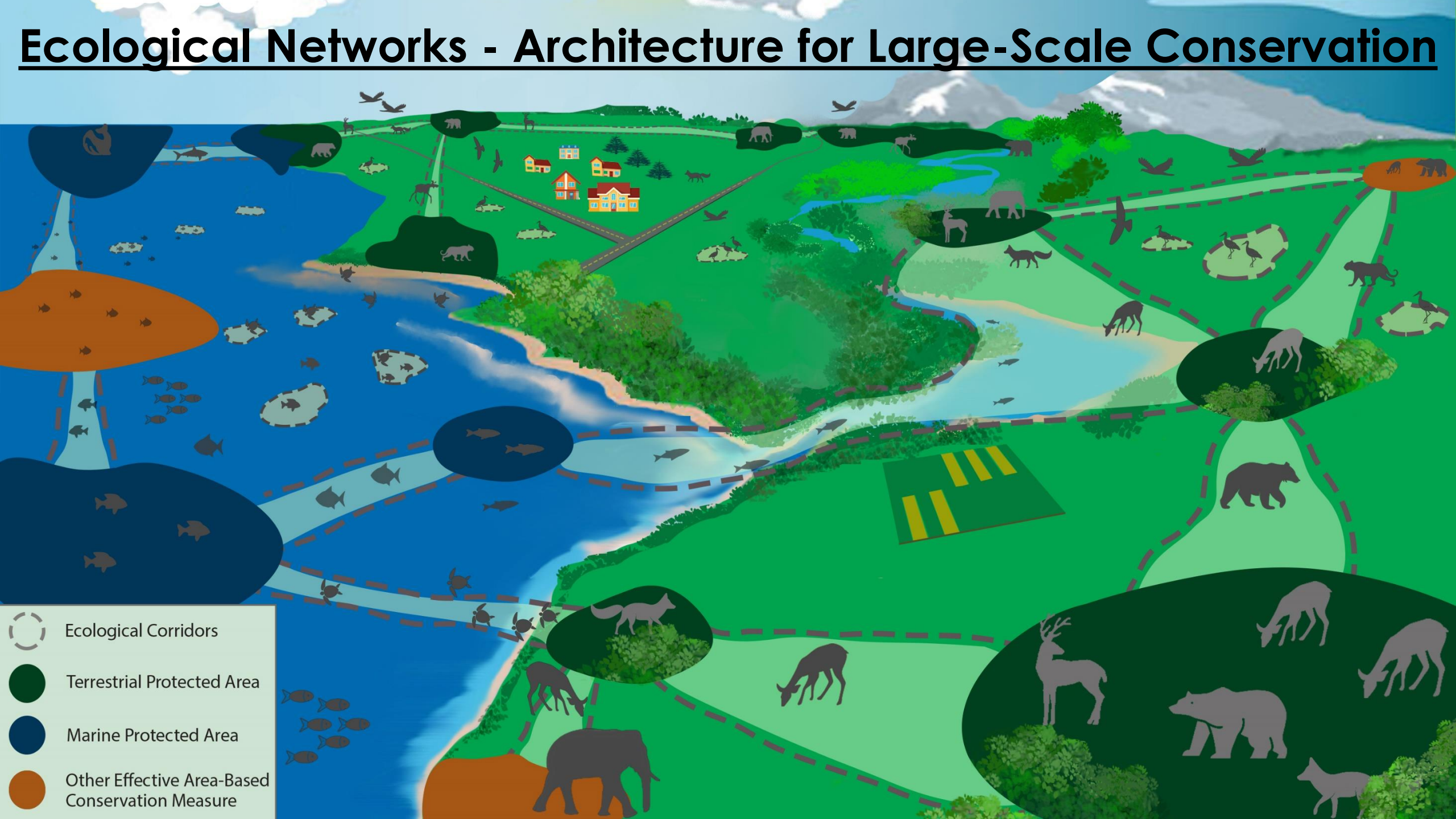
Connectivity
=
Climate Change Adaptation

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

WHAT is Connectivity Conservation?

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

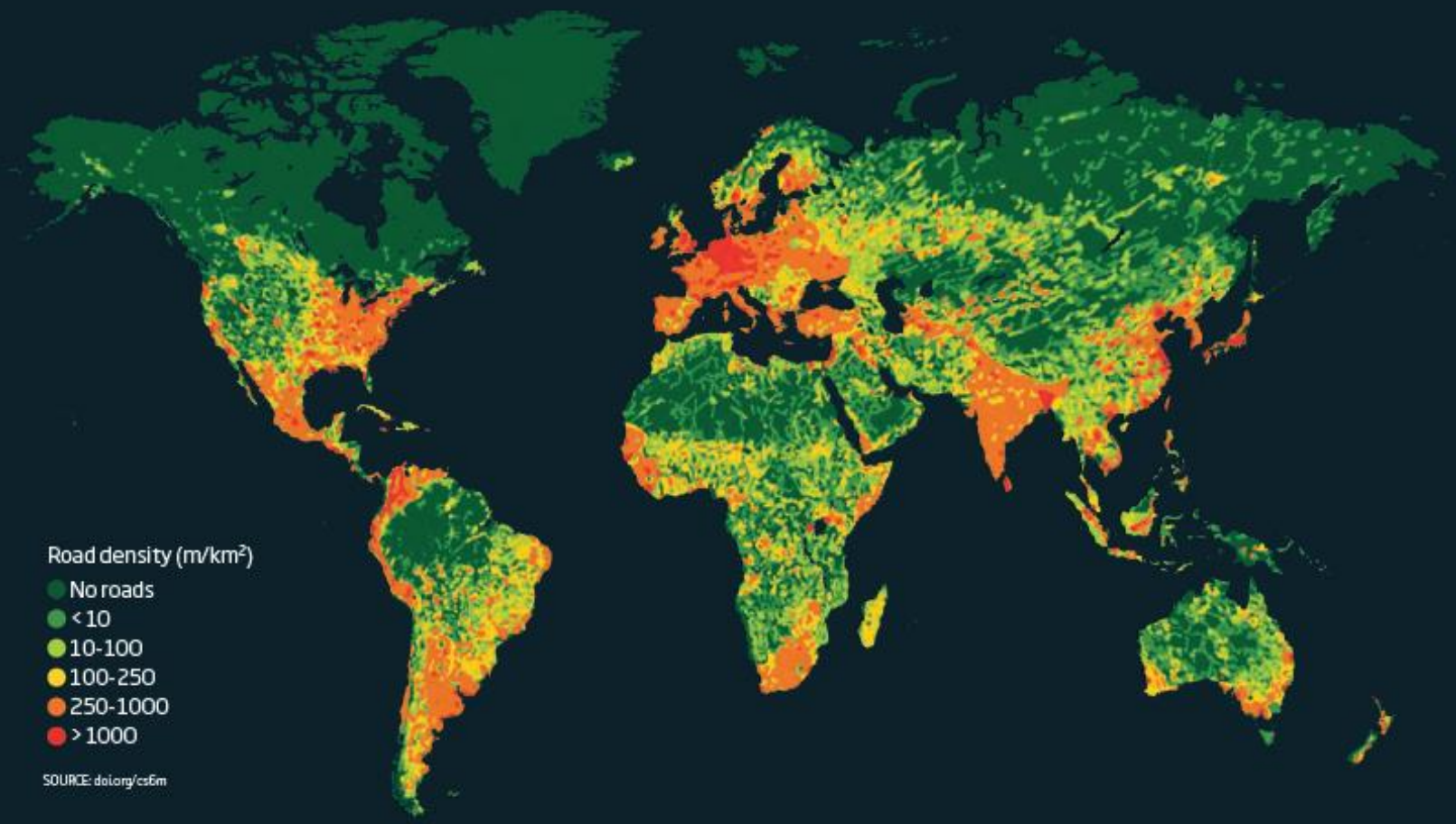
Ecological Networks - Architecture for Large-Scale Conservation



38 | NewScientist | 1 September 2018

PAVED PLANET

Large infrastructure programmes threaten biodiversity across the globe – with China's Belt and Road Initiative a new threat



Lawton, G. 2018. Road kill. New Scientist.

12 million km roads built since 2000

25 million km roads projected to be built by 2050

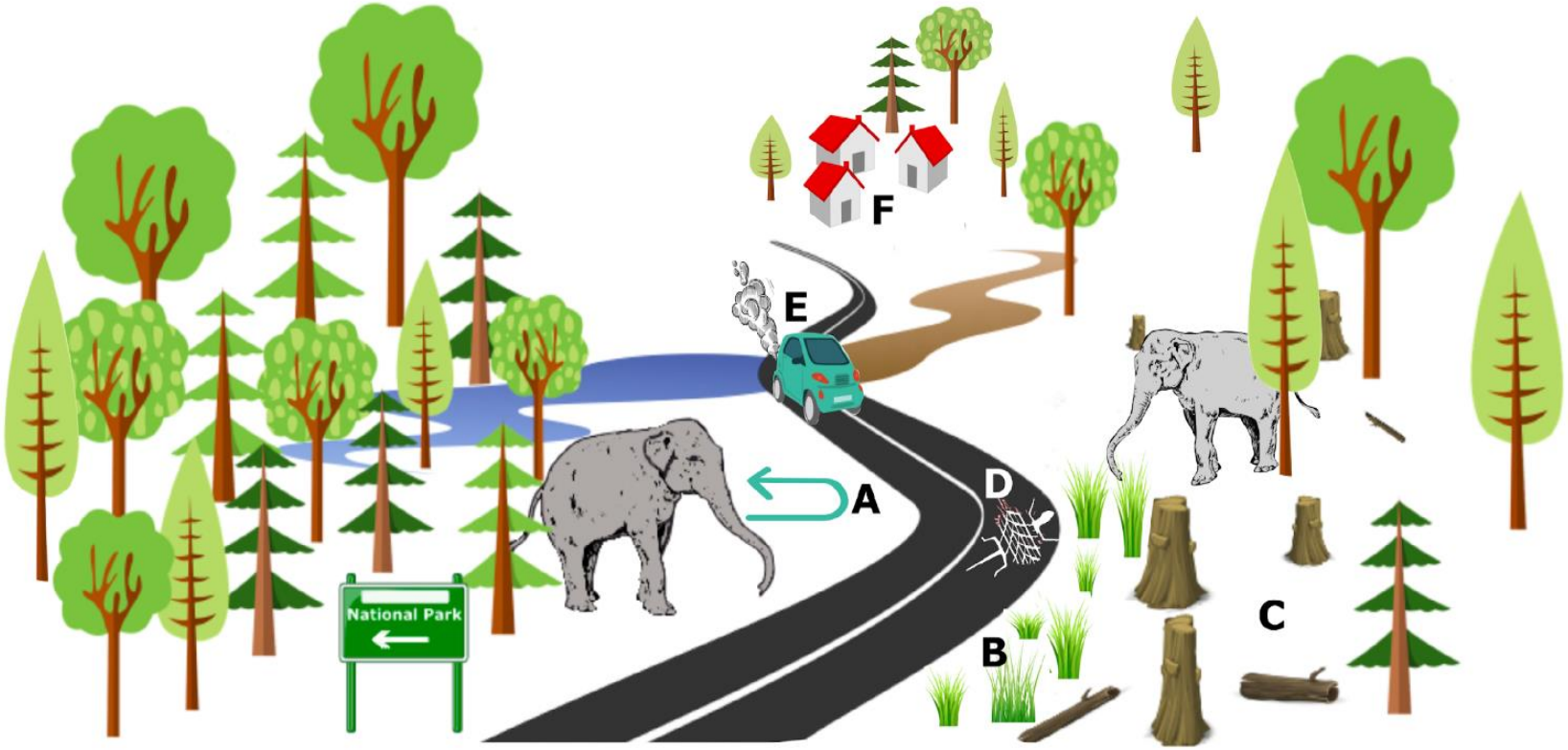
(Dulac, J. 2013.)

The World Has A Transport Problem

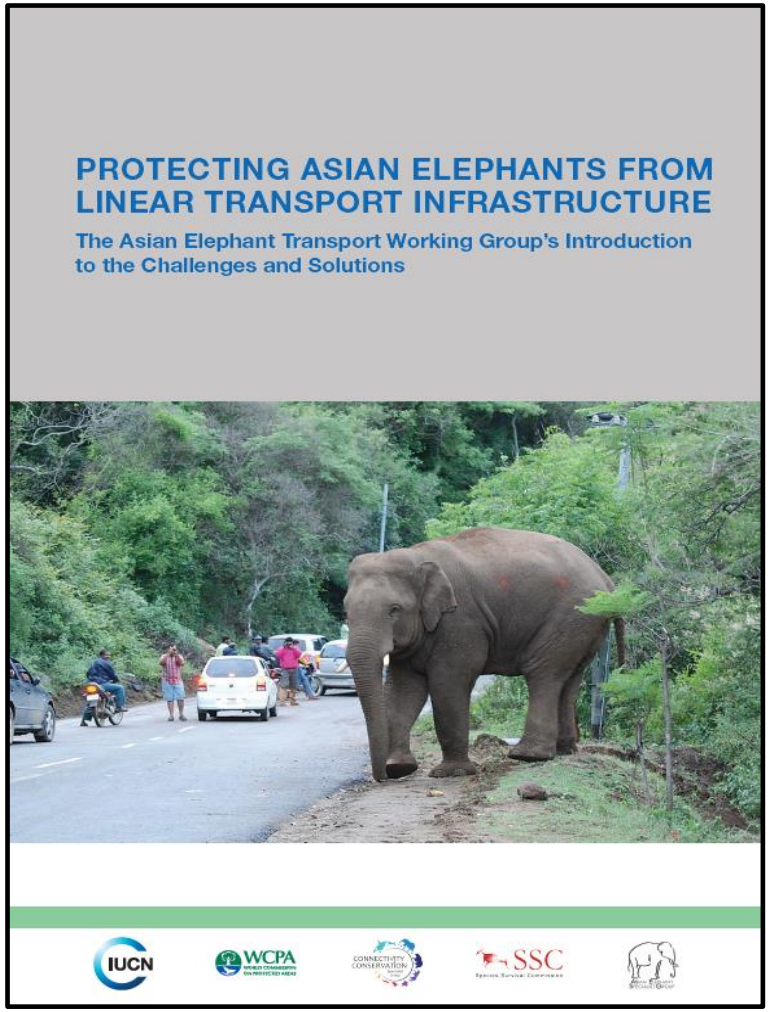
Beijing

Dehli

Impacts of LTI on Asian Elephants

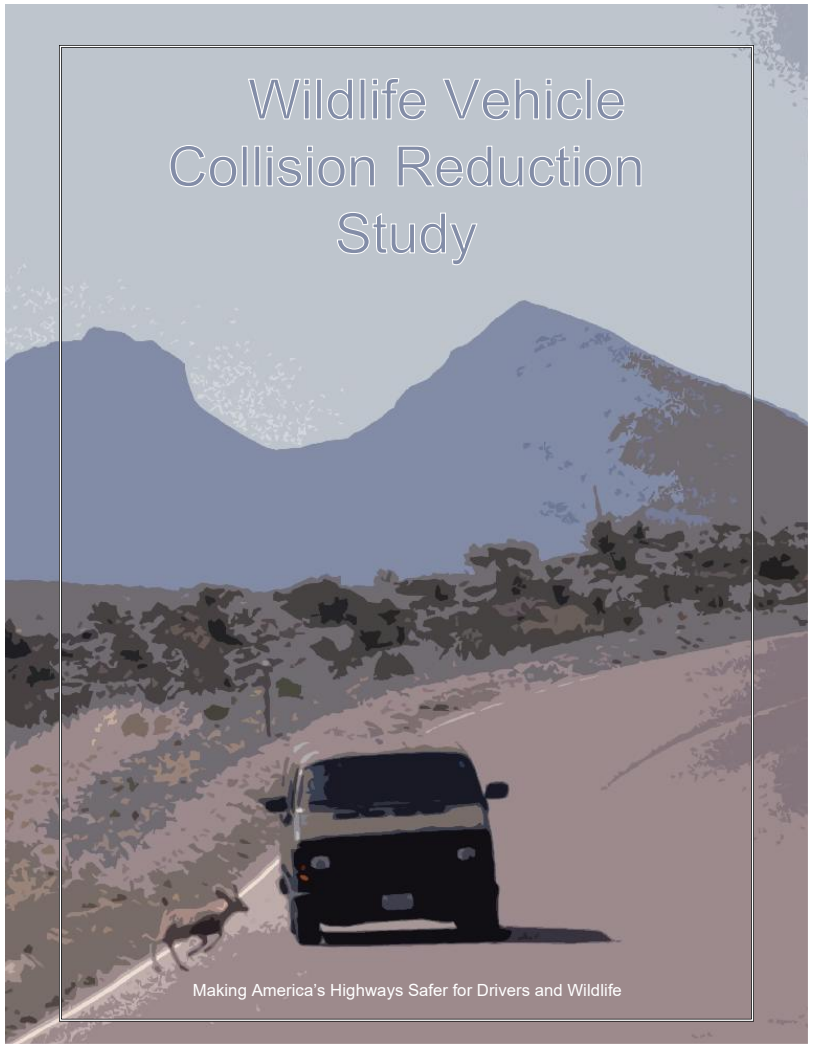


A. Barrier Effect
B. Attractant
C. Habitat fragmentation / edge effect
D. Mortality
E. Pollution
F. Human settlement



Overview: AVC NATIONAL STATISTICS (2020)

- There are an estimated 1-2 million collisions with large mammals in the U.S each year
- ~29,000 human injuries and ~200 fatalities each year
- WVCs have estimated direct costs to society of $8 billion each year in the U.S.
- Direct road mortality is a major threat to the survival of 22 threatened or endangered species in the U.S. or certain populations of that species



Mitigation Measure Strategies

A. Influence Driver Behavior

B. Influence Animal Behavior or Population Size

C. Separate Animals from the Road & Traffic

From:

Wildlife Vehicle Collision Reduction and Habitat Connectivity Study

LITERATURE REVIEW

2021

Prepared by: Marcel Huijser, Rob Ament, Matthew Bell, Tony Clevenger, Elizabeth Fairbanks, Kari Gunson, Terry McGuire

Ineffective Mitigation Measures

Modify Driver Behavior

Traditional static signs

Reduced posted speed limit

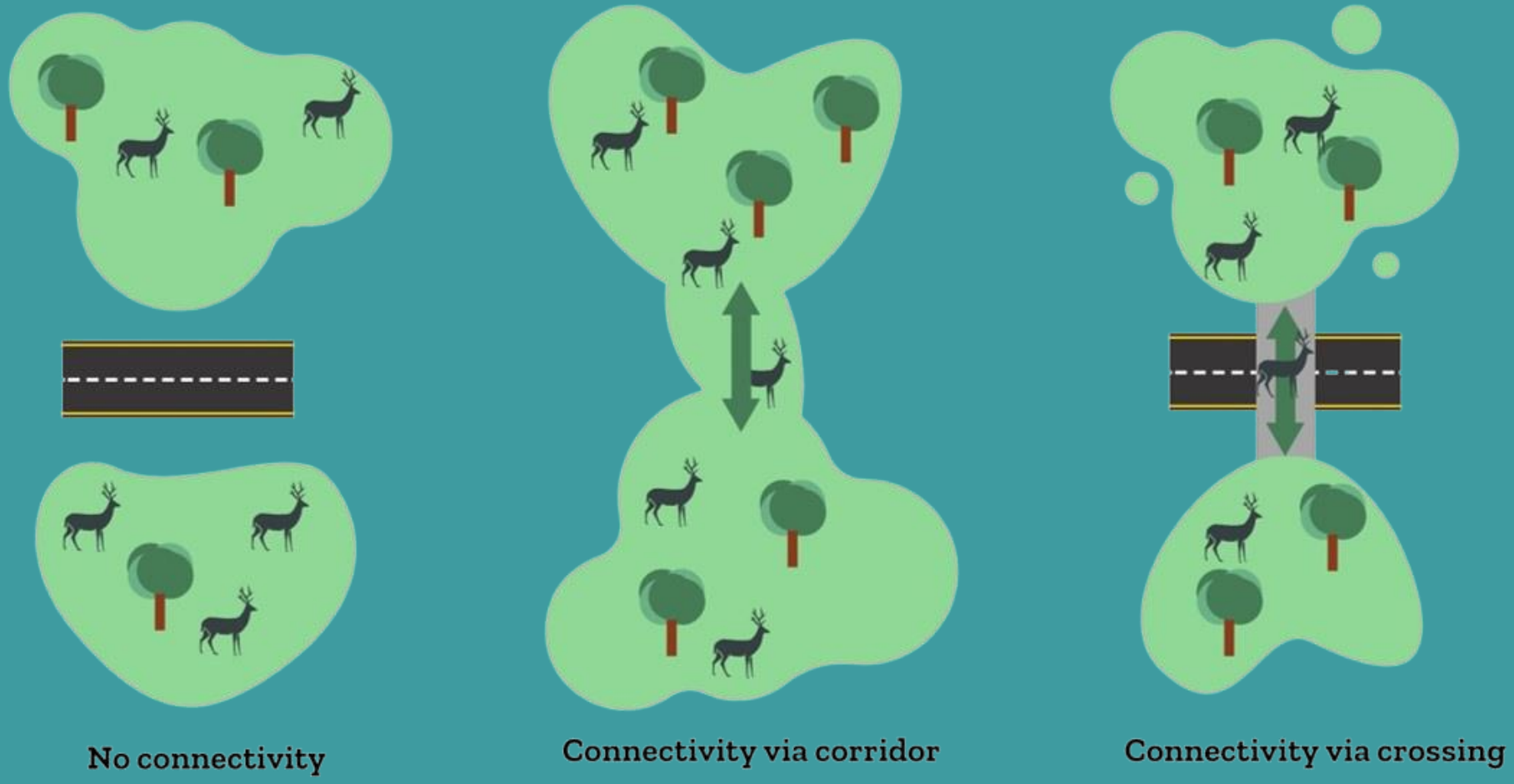
Reduced nighttime speed limit

Modify Animal Behavior

Deer whistles

Reflectors along road edge

Reduced roadside vegetation nutritional value



CONNECTIVITY CONSERVATION

“Ecological connectivity is the unimpeded movement of species and the flow of natural processes that sustain life on Earth.” (CMS, 2020)

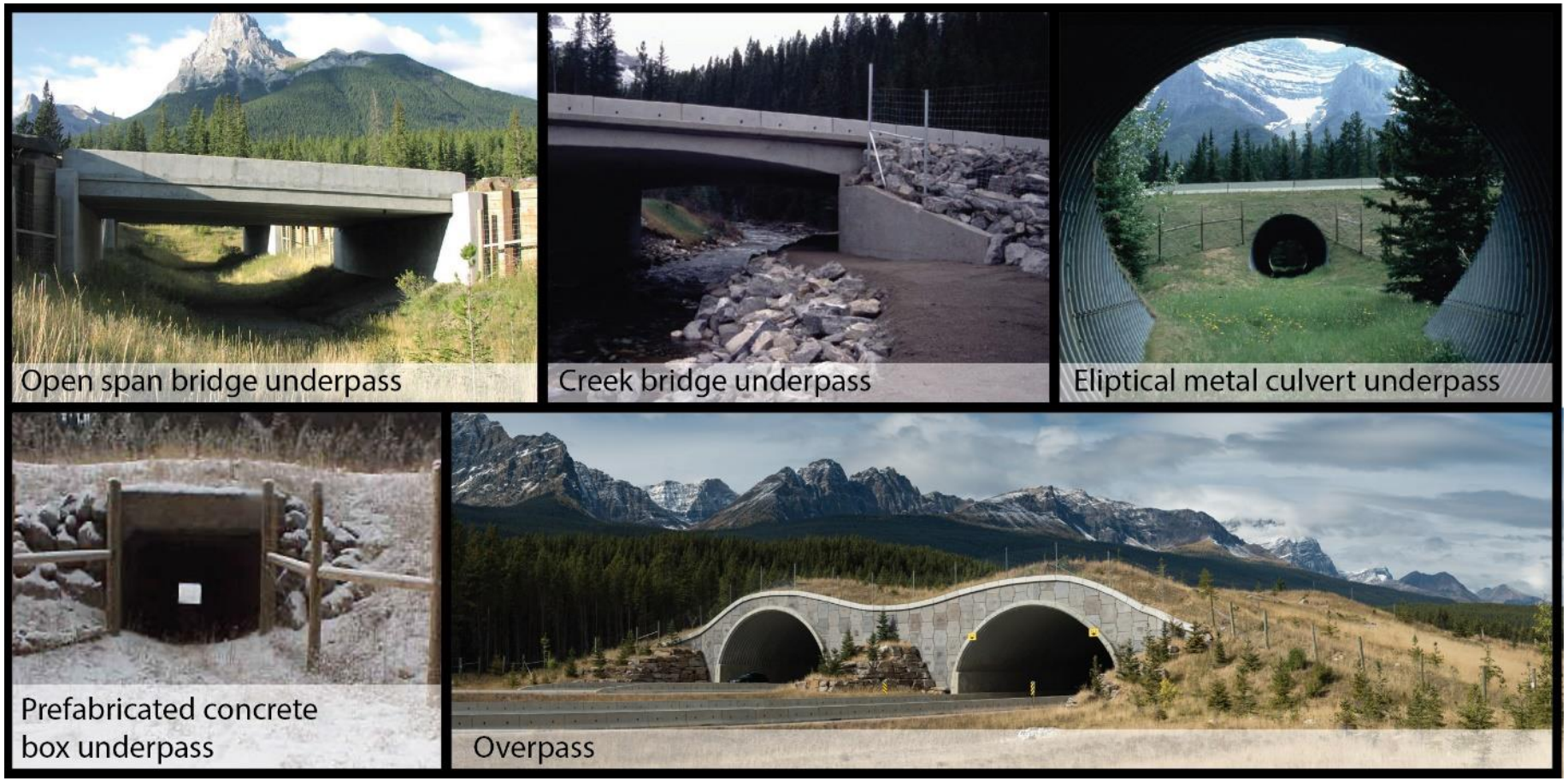
THE CASE FOR WILDLIFE CROSSINGS

National WVC Reduction Study

Mitigation Measure	Cost ($ / km / year)	% DVC Reduction
Deer reflectors and mirrors	$495	0%
Deer whistles	$23.5	0%
Standard warning signs	$18	0%
Seasonal wildlife warning signs	$27	26%
Vegetation removal	$500	38%
Fence with gap and crosswalk	$5,585	40%
Population culling	$2,508	50%
Relocation	$10,260	50%
Anti-fertility treatment	$61,702	50%
Animal detection systems (ADS)	$31,300	82%
Fence (including dig barrier)	$3,760	87%
Fence with gap and ADS	$9,930	82%
Fence with underpasses	$5,860	87% +
Fence with overpasses	$26,458	87% +
Fence with under- and overpasses	$7,510	87% +

Huijser et al. 2007

A VARIETY OF CROSSING STRUCTURES

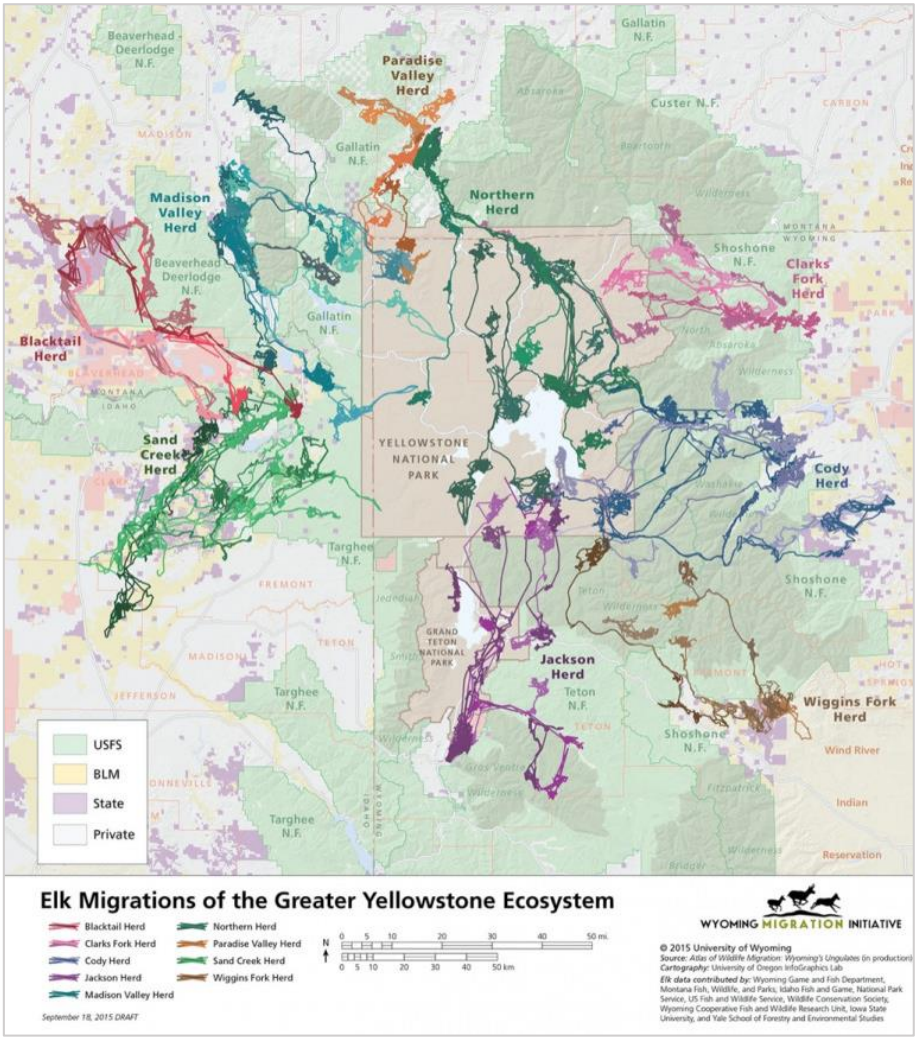


Wildlife Institute of India / Dr. Bilal Habib

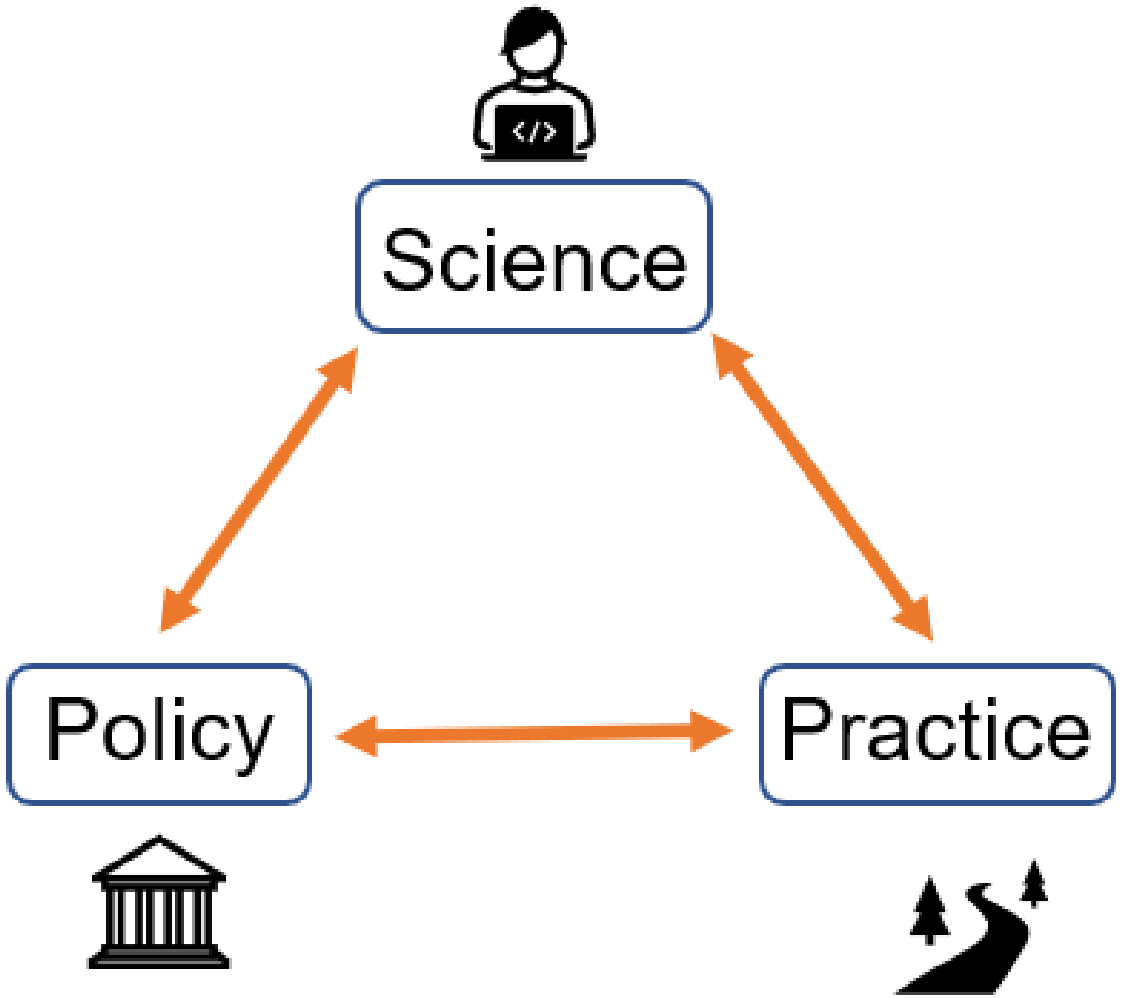
Milind Parikawam

Wildlife + Transportation Challenges

- Transboundary issue with many different management authorities and stakeholders needing to be involved
  - State DOTs and Wildlife Agencies
  - State and Federal Land Management Agencies
  - Private Landowners + Communities
  - Land Trusts
  - USFWS/FHWA
  - Etc…
- Competing agency missions, priorities, and cultures
- Lack of capacity specific to the issue
- Lack of dedicated funding streams
- Complex needs: data, funding, land security, community support
- Piecemeal approach rather than systematic planning



Overcoming Challenges: What is needed



To overcome complex challenges, we need a collaborative, interdisciplinary approach!

- Biology/Ecology
- Planning
- Engineering
- Economics
- Policy
- Communities

PARTNERSHIPS!!!

WHAT is needed?

Global guidelines for large-scale conservation!

CONNECTIVITY CONSERVATION
Specialist Group

IUCN WCPA
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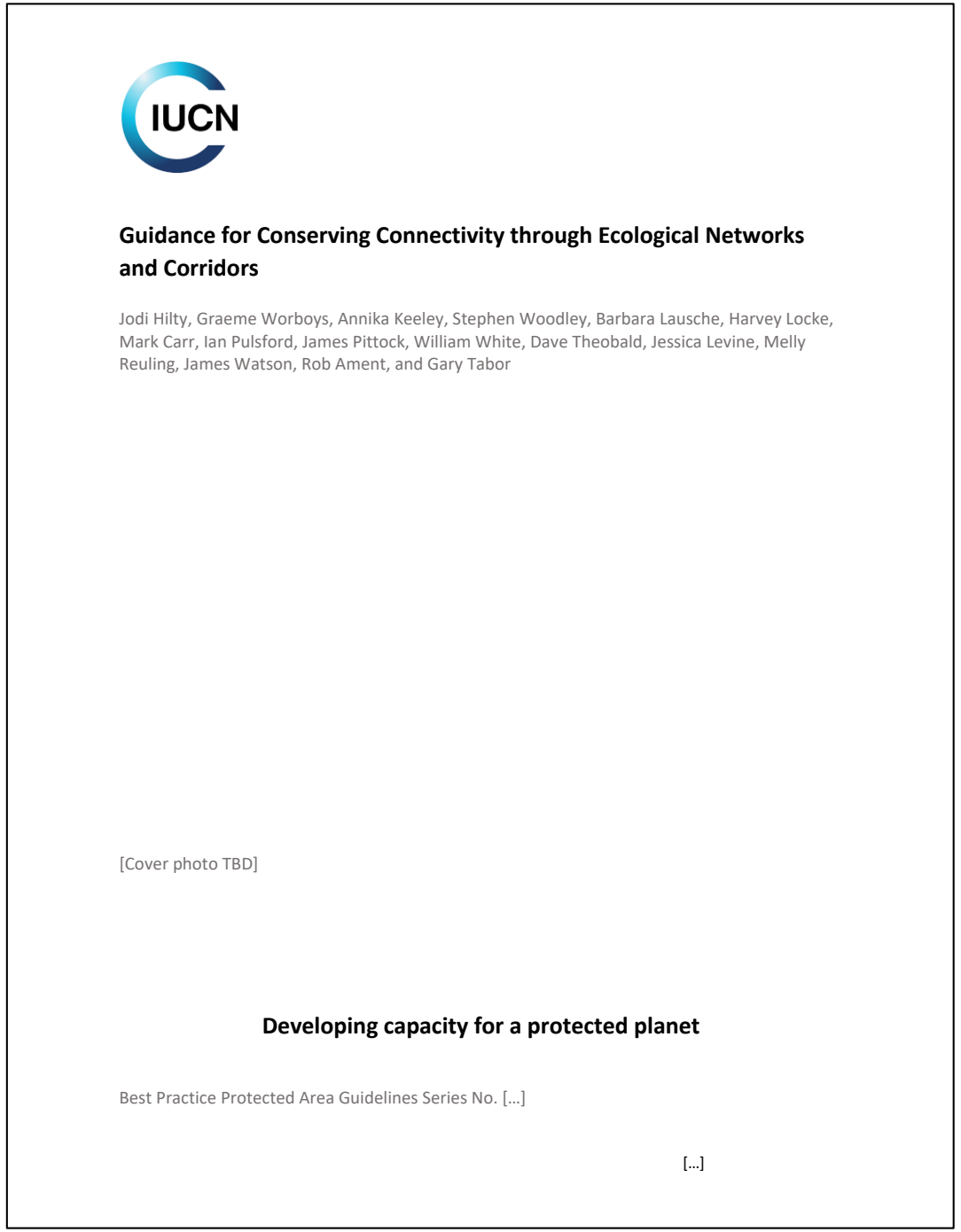


IUCN

Guidance for Conserving Connectivity through Ecological Networks and Corridors

Jodi Hilty, Graeme Worboys, Annika Keeley, Stephen Woodley, Barbara Lausche, Harvey Locke, Mark Carr, Ian Pulsford, James Pittock, William White, Dave Theobald, Jessica Levine, Melly Reuling, James Watson, Rob Ament, and Gary Tabor

[Cover photo TBD]

Developing capacity for a protected planet

Best Practice Protected Area Guidelines Series No. […]

[…]

What is Needed: Consistent Practices, Measurable Targets

- Defined Targets – Spatially Explicit
- Standards of Practice
- Planning Frameworks
- Incentive Based Approaches
- Recognition for Best Practice
- Learning Community

What is needed:

Local examples, practical tools, committed partners

CENTER for LARGE LANDSCAPE CONSERVATION

Blackfeet Nation

Animal-Vehicle Collision Reduction Master Plan

Rob Ament: Road Ecology Program Manager, The Western Transportation Institute, Montana State University
Liz Fairbank: Conservation Associate, Center for Large Landscape Conservation
Renee Callahan, Marcel Huijser, Tyler Creech

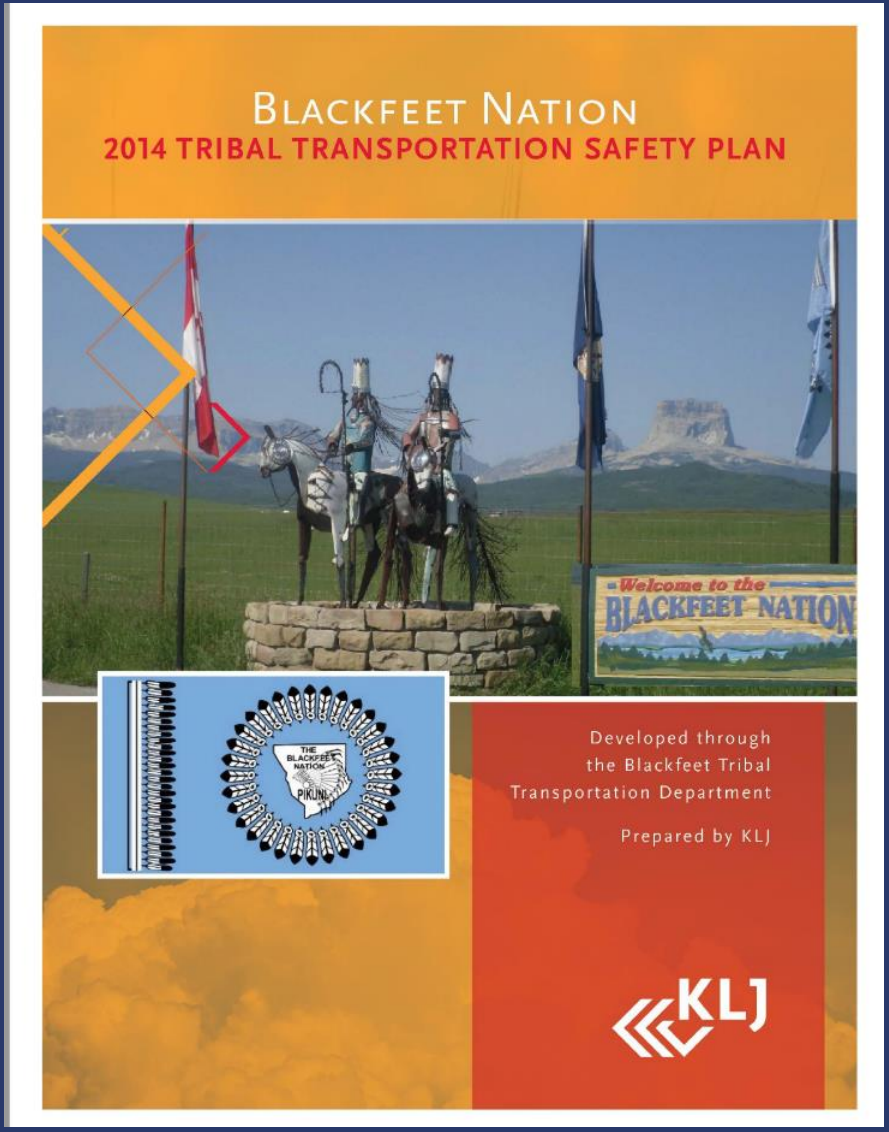
THE CENTER FOR LARGE LANDSCAPE CONSERVATION

BLACKFEET NATION FISH & WILDLIFE

MONTANA STATE UNIVERSITY | Western Transportation Institute

Blackfeet Safety Plan

- Updated its Plan in 2014
- From 1996 to 2013 on the Blackfeet Reservation, there were:
  - 1730 crashes
  - 150 fatalities
  - 1000 injuries
- The 2014 Plan identified 4 key strategies moving forward known as the "4E's of Safety"
  - Education
  - Enforcement
  - EMS
  - Engineering
- Collisions with domestic and wild animals identified as a Top 3 priority



Blackfeet Climate Change Adaptation Plan

BLACKFEET NATION

April 2018

blackfeetclimatechange.com

Key Components of Master Plan

- Crashes
- Connectivity
- Conservation
- Culture

Data Collection and Analysis

Connectivity Data

Where are the animals crossing the road?

Radio-collar Data

Riparian Climate Corridors

Grasslands Connectivity

Habitat Suitability Models

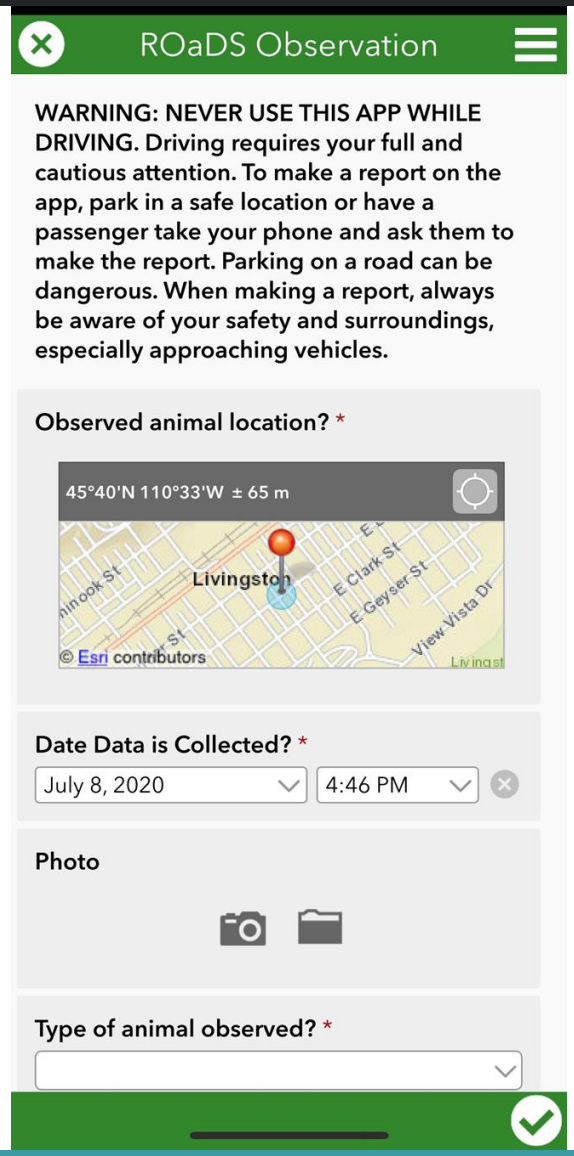
Tribal ROaDS Smartphone App

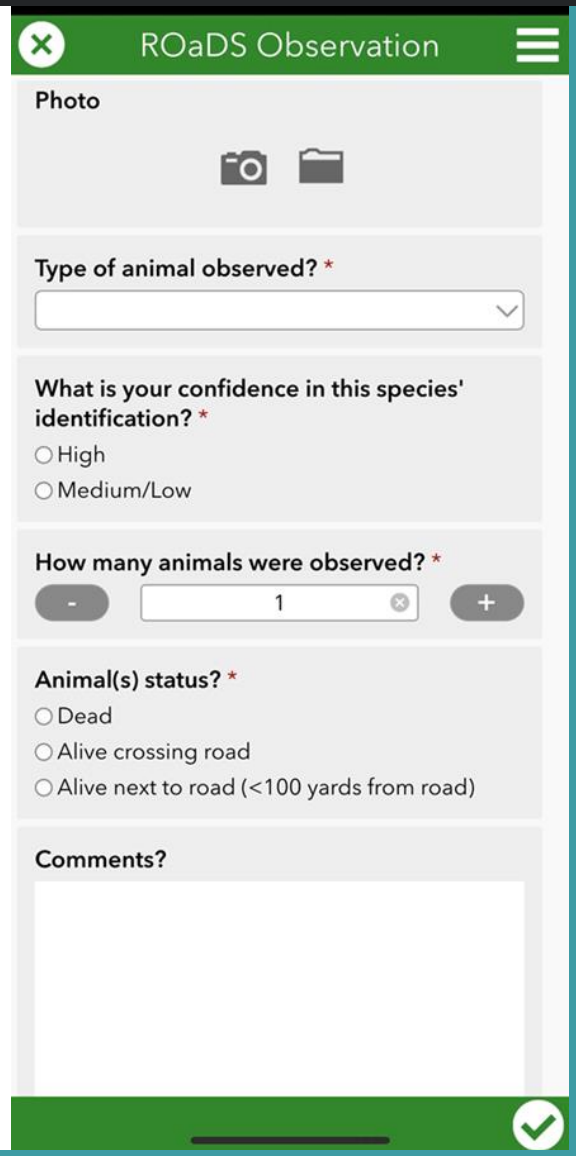
ROaDS Smartphone App

Allows for collection of data on roadkill and wildlife movements near roads

Standardized Data Fields

1. **Location:** GPS coordinates to within a few meters accuracy
2. **Date**
3. **Time**
4. **Photo**
5. **Species** (Can customize, includes “other” with a dropdown to type in spp type)
6. **Observer Confidence Level**
7. **Number of Animals**
8. **Status** (Dead, Alive crossing road, Alive near road)
9. **Observer Comments**





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Data Collection and Analysis

MAPPING EXERCISE:

Completed at Public Meeting #1 in March 2019

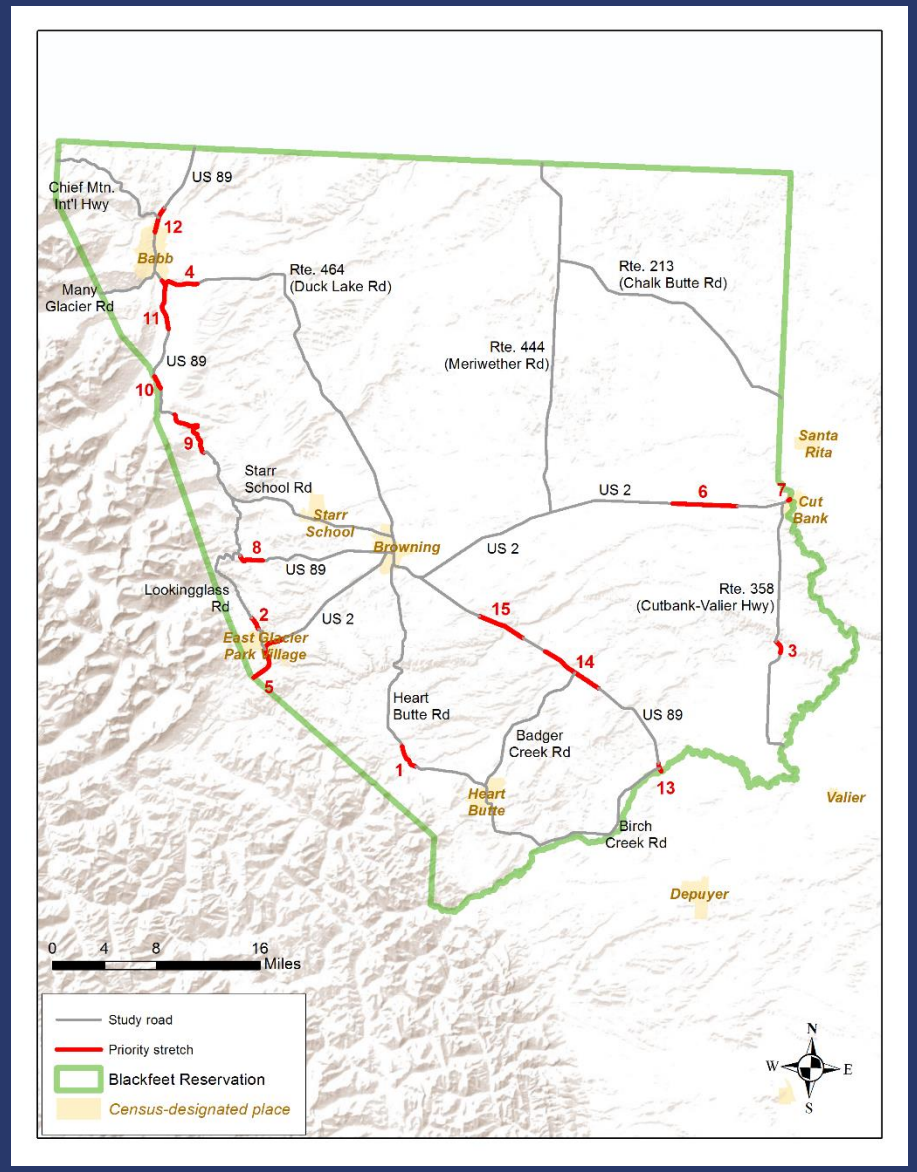
Over 160 data points were collected during this exercise

- Traditional Ecological Knowledge
- Local Knowledge
- Citizen Science
- Community Involvement

Identification of Priority Road Segments

Table 1: Description of prioritization characteristics.

Characteristic	Description	Evaluation method
WVC risk	Frequency of collisions with wildlife	Data analysis
DAVC risk	Frequency of collisions with domestic animals	Data analysis
Total AVC risk	Frequency of collisions with all animals	Data analysis
Live wildlife on/near roads	Intensity of wildlife use of roads and roadside environments	Data analysis
Live domestic animals on/near roads	Intensity of domestic animal use of roads and roadside environments	Data analysis
All animals on/near roads	Intensity of all animal use of roads and roadside environments	Data analysis
Regional conservation value	Contribution to regional conservation (if mitigated) by serving as a movement corridor or high-quality wildlife habitat at the regional scale	Data analysis

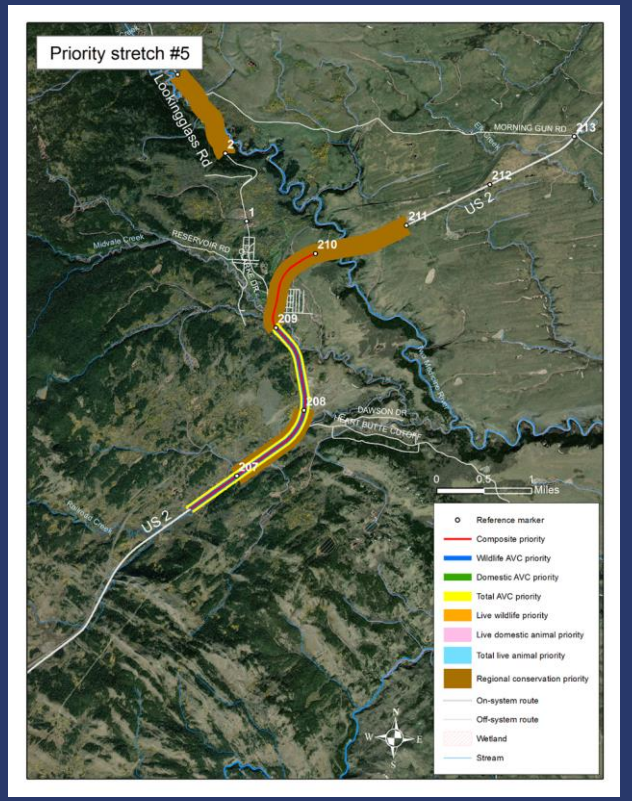


Mitigation Recommendations

PRIORITY SITE #1:

Segment 5: ***Highway 2 MP 206-210. Bordering Glacier National Park. Average Daily Traffic=2774.***

- Regional and local conservation priority and a wildlife and domestic AVC priority.
- Important for a variety of wildlife including elk, moose, grizzly bears, and lynx, among others. The streams and wetlands occurring directly adjacent to the road in many places in this area are prime habitat for moose.
- Both moose and grizzly bears have been killed by vehicles on this segment in recent years, and that young moose have become entangled in the barbed-wire livestock fencing.
- Land ownership is primarily private "fee" land, with a few small blocks of allotted and tribal land. Conservation easements needed.
- Railroad tracks run parallel to the road along this segment, and have been a source of mortality for grizzlies and other animals. *Any mitigation actions in this area should consider both the road and the railroad*.



- Recommended Mitigation Actions: In order to address the multi-species habitat connectivity and safety concerns a combination of overpass(es), underpasses, and wildlife-proof fencing are recommended along this segment. This overpass could be coupled with an overpass across the adjacent low volume access road and railroad tracks, though this is outside of the scope of this road study and would require a partnership with the railroad and other private landowners to address this issue.

Renderings of Proposed Mitigation Measures

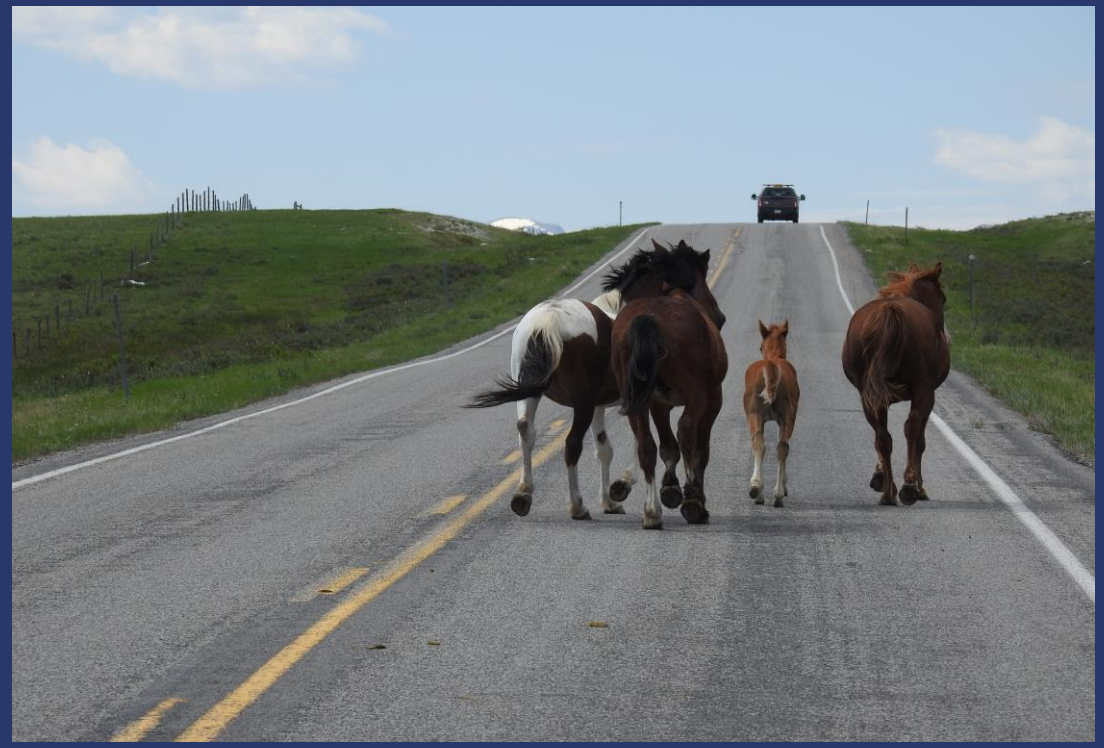
Current photo of existing bridge over the Two Medicine River

Artist Rendering of Proposed Bridge Modification:
Lookingglass Road: Segment 2 (Priority Rank=10)

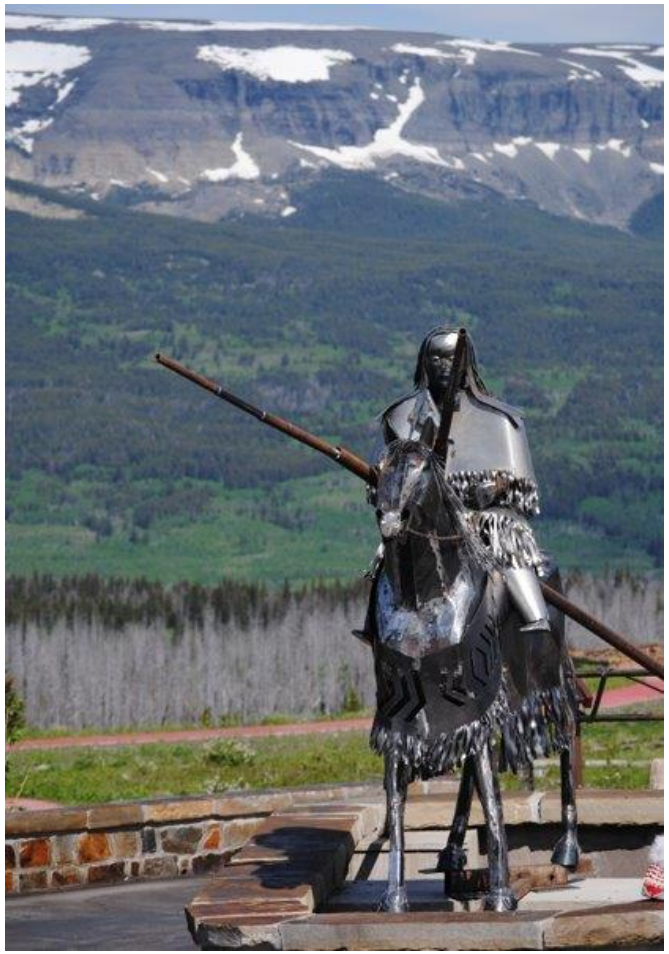
Additional Recommendations

- Several off-system routes were repeatedly noted as being major problems for AVCs, especially with livestock. While these routes did not have enough data available to rank on our priority list, we recognize that this is an issue of insufficient data not insufficient risk.

- We recommend wildlife-friendly ROW fencing to keep livestock off of these roads.



Thank you!



For more information, contact Katie Deuel at The Center for Large Landscape Conservation:
kdeuel@largelandscapes.org

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CONNECTIVITY
IS THE SAFETY NET OF NATURE

What is connectivity?

Connectivity is the degree to which landscapes and seascapes allow species movement and natural ecological processes.

What does connectivity do?

Allows species to migrate or disperse to feed, breed, and respond to climate change. Allows natural communities to thrive by maintaining ecosystem functions like pollination and stream flows.

What do we want?

Connected lands and waters: wildlife corridors, landscape linkage areas, free flowing and connected rivers, interconnected coastal and marine zones, and climate-resilient ecosystems.

Why do we care?

Connected lands and waters benefit nature and people. As the climate changes and development increases, we must act now to save and restore natural connections across all lands and waters.

LEARN MORE:
conservationcorridor.org/ccsg

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CONECTIVIDAD
ES LA RED DE SEGURIDAD DE LA NATURALEZA

¿Qué es conectividad?

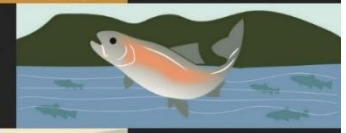
La conectividad es el grado en que los paisajes terrestres y marinos permiten el movimiento de especies y procesos ecológicos naturales.

¿Qué hace la conectividad?

Permite a las especies migrar o dispersarse para buscar alimento, reproducirse y adaptarse al cambio climático. También permite prosperar a las comunidades naturales manteniendo funciones ecosistémicas como la polinización y los cauce de ríos y quebradas.

¿Qué queremos?

Tierras y aguas conectadas: corredores de vida silvestre, áreas de conectividad del paisaje, ríos conectados que fluyen libremente, zonas costeras y marinas interconectadas, y ecosistemas resilientes al clima.



¿Por qué debería importarte?

Las tierras y las aguas conectadas benefician a la naturaleza y a las personas. A medida que el clima cambia y el desarrollo urbano aumenta, se hace más urgente actuar para salvar y restablecer las conexiones naturales a través de todos los paisajes terrestres y acuáticos.

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APRENDA MÁS:
conservationcorridor.org/ccsg

连通性是大自然的安全屏障

什么是连通性?

"连通性"是指陆地景观与海洋景观允许物种运动和自然生态变化的程度。

连通性有何用?

让物种得以迁徙或分散开来，以觅食、繁殖并应对气候变化；可使自然群落通过维持生态系统功能（如授粉和溪流）而生机勃勃。

我们都做什么?

形成互连的陆地与水域：野生动物廊道、景观连接地区、自由流淌且水系相通的河流、相互连接的沿海和海洋区域，以及富有气候弹性的生态系统。

为什么我们关注连通性?

互相连接的陆地和水域有益于大自然与人类。随着气候变化和发展的增长，我们现在必须采取行动，以保存并恢复所有陆地与水域的天然连通。

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详情参见：
conservationcorridor.org/ccsg