

An aerial photograph of a landscape featuring a road that curves through a lush green valley. In the background, there are several mountain peaks, some with patches of snow. The sky is clear and blue. The overall scene is a mix of natural beauty and infrastructure.

# Managing connectivity to accept change

## Talk Roadmap

- Connectivity for Climate Adaptation
- Climate Smart Connectivity
- Three Case Studies of Connectivity at Different Scales

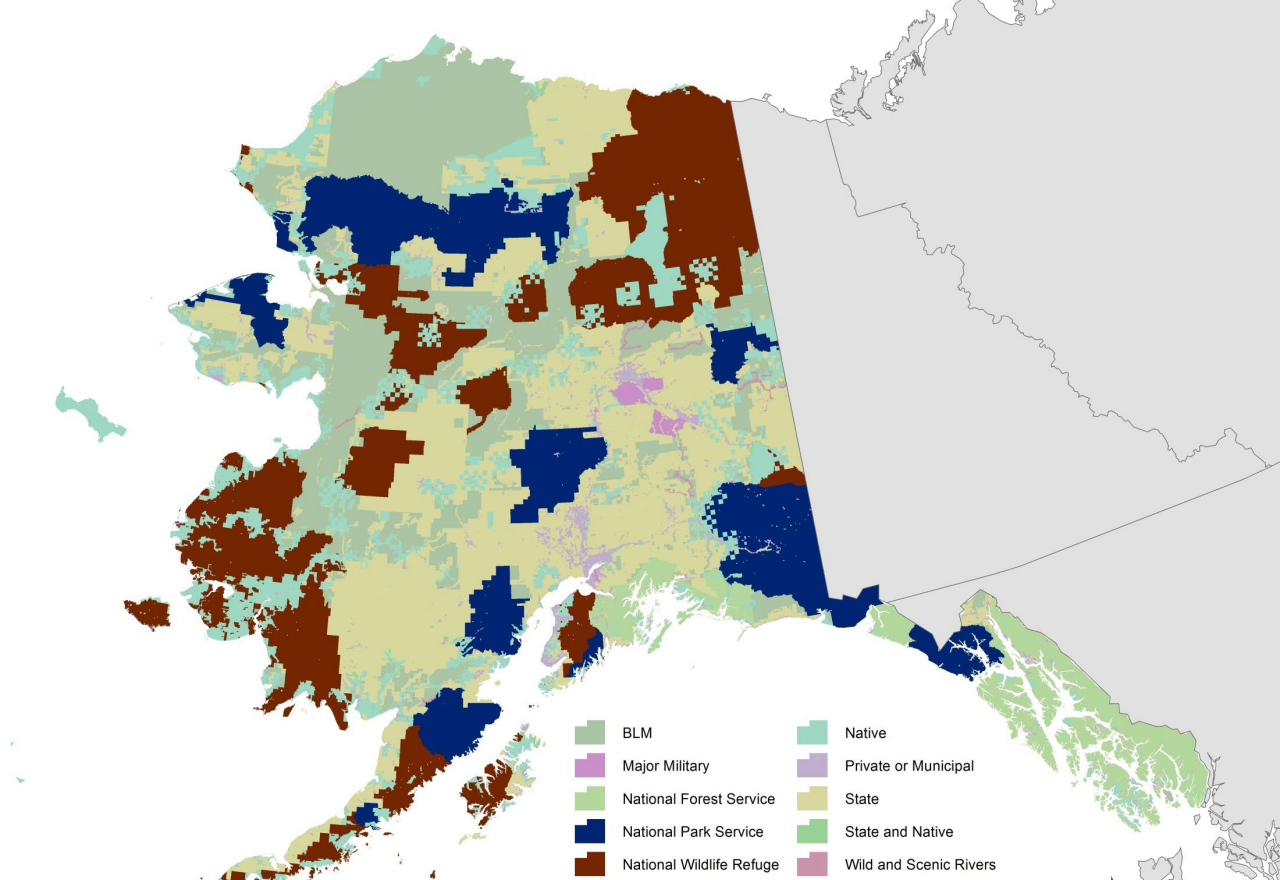
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# Connectivity as a Climate Adaptation Strategy

- Species moved in response to past climate change
- Maintaining and restoring landscape connectivity is a widely suggested climate adaptation strategy
- Low risk strategy – makes sense even without climate change

**Climate Resilient Approaches:** Connect conservation lands using enduring features that will not change (topography and land use)





# Alaska National Interest Lands Conservation Act (ANILCA) of 1980

# Central Yukon

## Resource Management Plan and Environmental Impact Statement

**DRAFT**

**Volume 1: Executive Summary, Chapters 1-3, Glossary, References, and Index**

**December 2020**


Prepared by:

U.S. Department of the Interior  
Bureau of Land Management

In Cooperation with:

U.S. Fish and Wildlife Service  
Allakaket Tribal Council  
Ruby Tribal Council  
Koyukuk Tribal Council  
Tanana Tribal Council  
Nulato Tribal Council  
Venetie Tribal Council  
State of Alaska

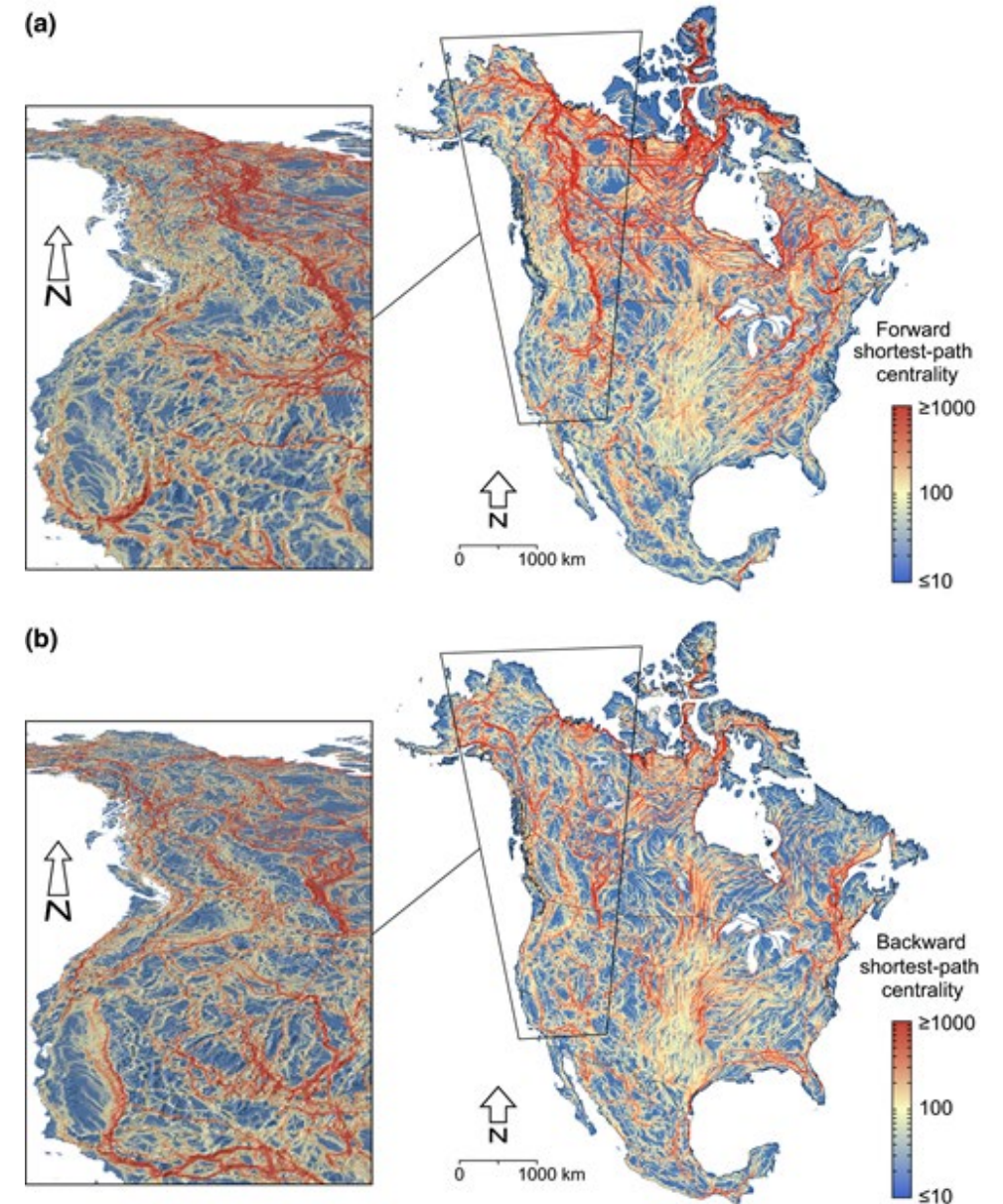
Estimated Lead Agency Total Costs Associated  
with Developing and Producing this Preliminary  
Draft RMP/EIS  
\$5,087,191



Maintaining connectivity  
requires hard work, but it is  
an accept strategy

# Approaches to Design Climate Smart Connectivity

- Connect enduring features that will not change
  - Conserving Nature's Stage
  - Focus on geodiversity (stage) and not the actors (species)
- Connect the historical climate to future climate
  - Climate velocity
  - Climate envelop models



# Multijurisdictional Planning: Central-Yukon Resource Management Plan

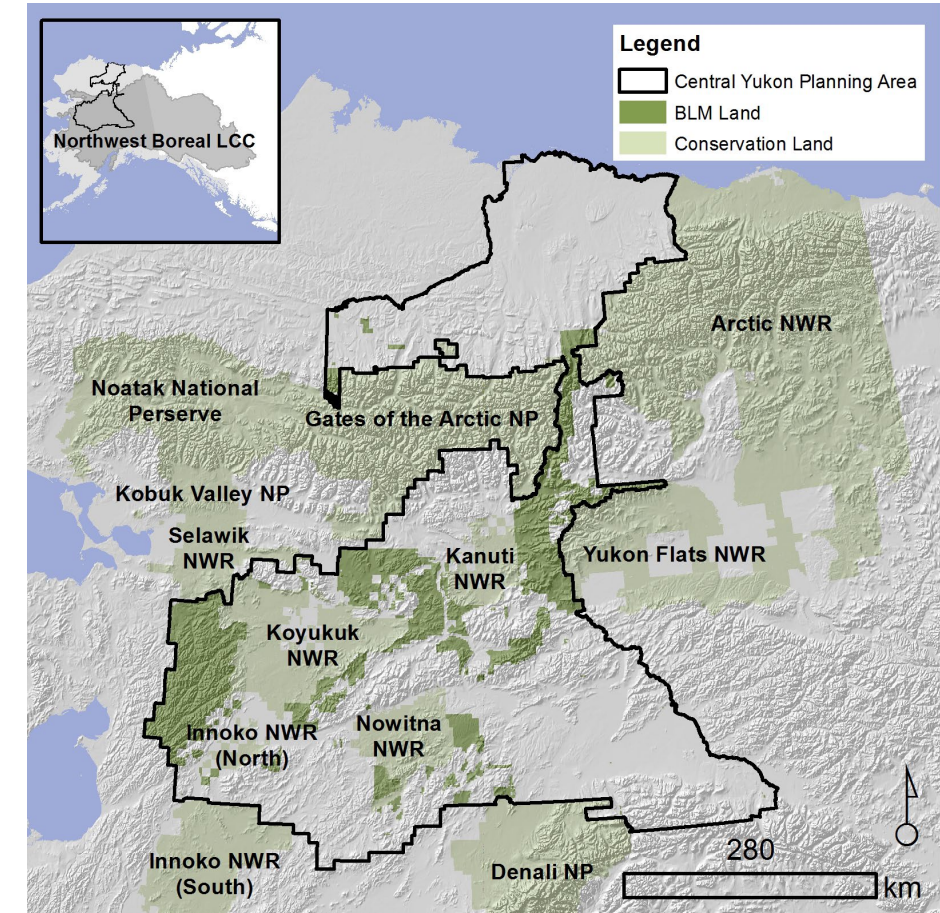
- Resource Management Plans (RMPs) serve as land management blueprints for BLM
- Geodiversity approach to identify landscape linkages

*Ecological Applications*, 22(1), 2012, pp. 87–103  
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## Use of land facets to design linkages for climate change

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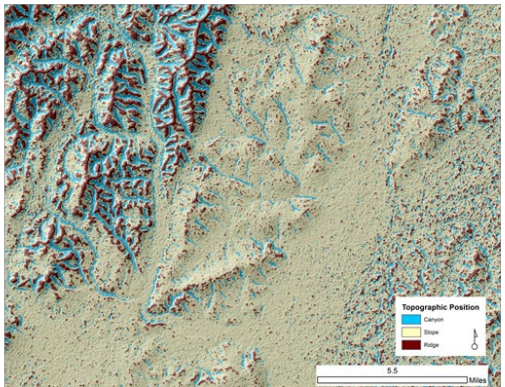


Magness, D.R., Sesser, A.L. & Hammond, T. Using topographic geodiversity to connect conservation lands in the Central Yukon, Alaska. *Landscape Ecol* 33, 547–556 (2018). <https://doi.org/10.1007/s10980-018-0617-0>

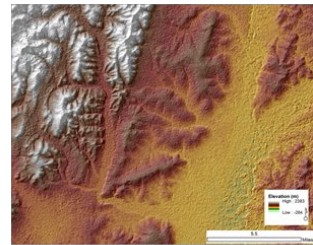
# Multijurisdictional Planning: BLM's Central-Yukon Resource Management Plan

## Topographic Position

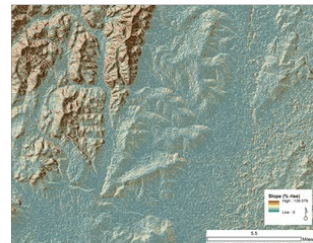
- Ridge
- Slope
- Canyon



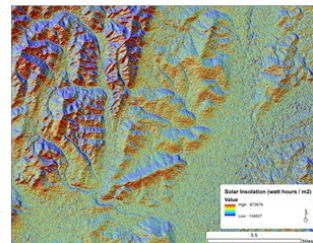
## Elevation



## Slope



## Solar Insolation



## Geodiversity Types (Clustering algorithm)

Table 1 Geodiversity types

	% of area	Elevation m mean (SD)	Slope degrees mean (SD)	Solar insolation W h/m <sup>2</sup> mean (SD)
Canyon 1—low elevation, gentle	12	228 (188)	10 (6)	N/A
Canyon 2—mid elevation, moderate slopes	2	1019 (249)	17 (7)	N/A
Canyon 3—high elevation, steep	1	1216 (328)	35 (8)	N/A
Slope 1—high elevation, steep, cool	1	1071 (347)	31 (9)	388,029 (91,064)
Slope 2—low elevation, moderate slopes, warm	13	274 (200)	13 (5)	510,625 (46,395)
Slope 3—low elevation, gentle, warm	24	144 (111)	5 (3)	581,575 (30,630)
Slope 4—mid elevation, moderate, warm	5	898 (204)	10 (5)	604,710 (56,649)
Slope 5—low elevation, moderate, hot	15	203 (138)	10 (5)	642,439 (35,271)
Slope 6—high elevation, steep, hot	1	1155 (325)	29 (9)	705,099 (72,364)
Ridge 1—low elevation, gentle	12	266 (202)	11 (6)	N/A
Ridge 2—high elevation, moderate	2	1175 (295)	19 (8)	N/A
Ridge 3—high elevation, steep	1	1311 (351)	36 (8)	N/A

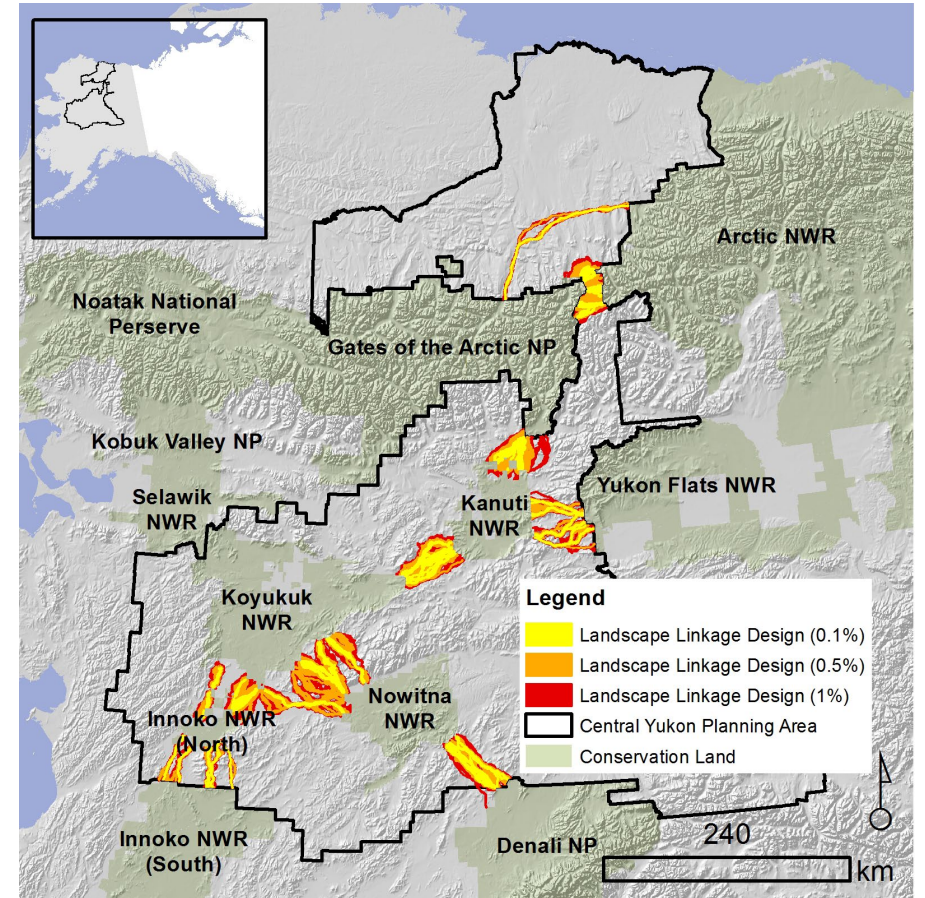
Magness, D.R., Sesser, A.L. & Hammond, T. Using topographic geodiversity to connect conservation lands in the Central Yukon, Alaska. *Landscape Ecol* 33, 547–556 (2018). <https://doi.org/10.1007/s10980-018-0617-0>

# Multijurisdictional Planning: BLM’s Central-Yukon Resource Management Plan

*“The resulting landscape linkage design consists of as little as 1% of the planning area, but can connect over 64 million acres of conservation land”*

**Table 2** Landscape linkages

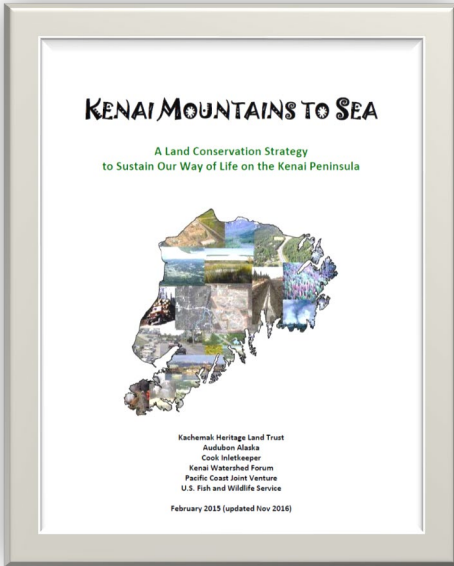
	Minimum distance between conservation units (km)	0.1% landscape linkage area (km <sup>2</sup> )	Area of contiguous conservation lands connected (km <sup>2</sup> )
Arctic NWR and gates of the Arctic NP	13	352	202,343
Koyukuk NWR—Innoko NWR (North)	18	239	93,078
Kanuti NWR—Gates of the Arctic NP	23	296	89,031
Innoko NWR (North) and Innoko NWR (South)	37	101	16,187
Kanuti NWR—Yukon Flats NWR	48	197	117,359
Kanuti NWR—Koyukuk NWR	50	393	97,125
Koyukuk NWR—Nowitna NWR	55	492	97,125
Denali NP and Nowitna NWR	61	318	32,375



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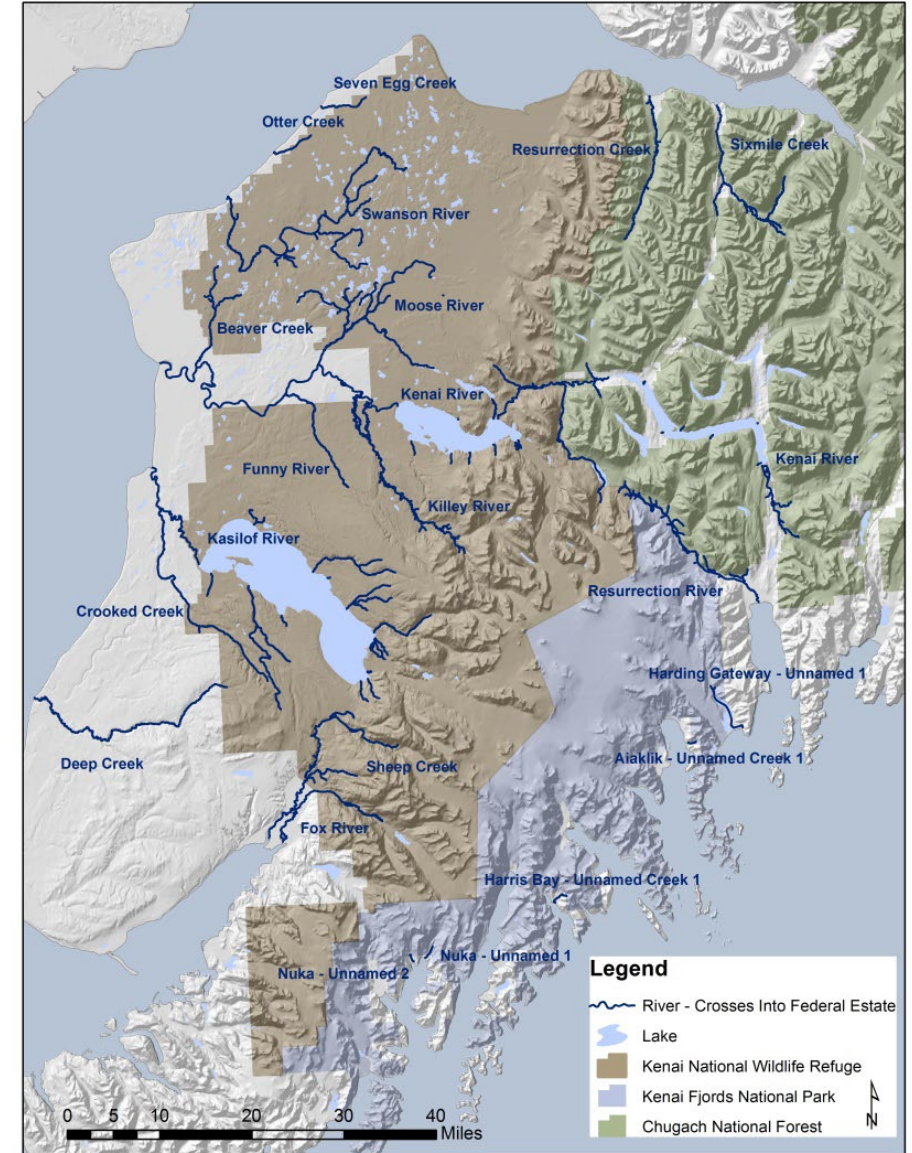


# Regional River Connectivity: Mountains to Sea:

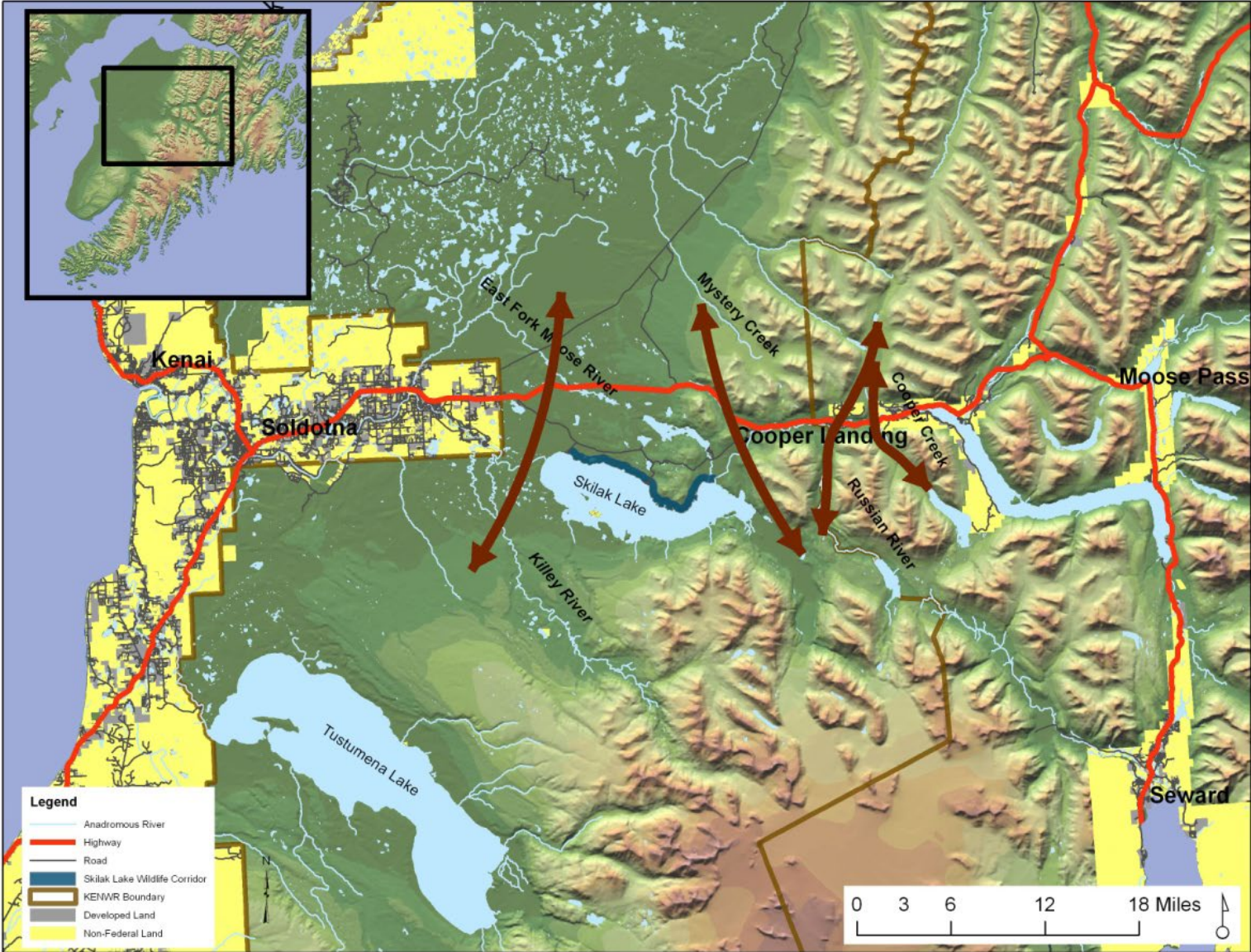


386 river outlets = 1800 river miles

- Inside Federal Conservation Estate: 212 outlets (55%) = 217 miles (12%)
- On private lands: 152 outlets (39%) = 561 miles (31%)
- Interjurisdictional: **22 outlets (6%) = 968 miles (54%)**

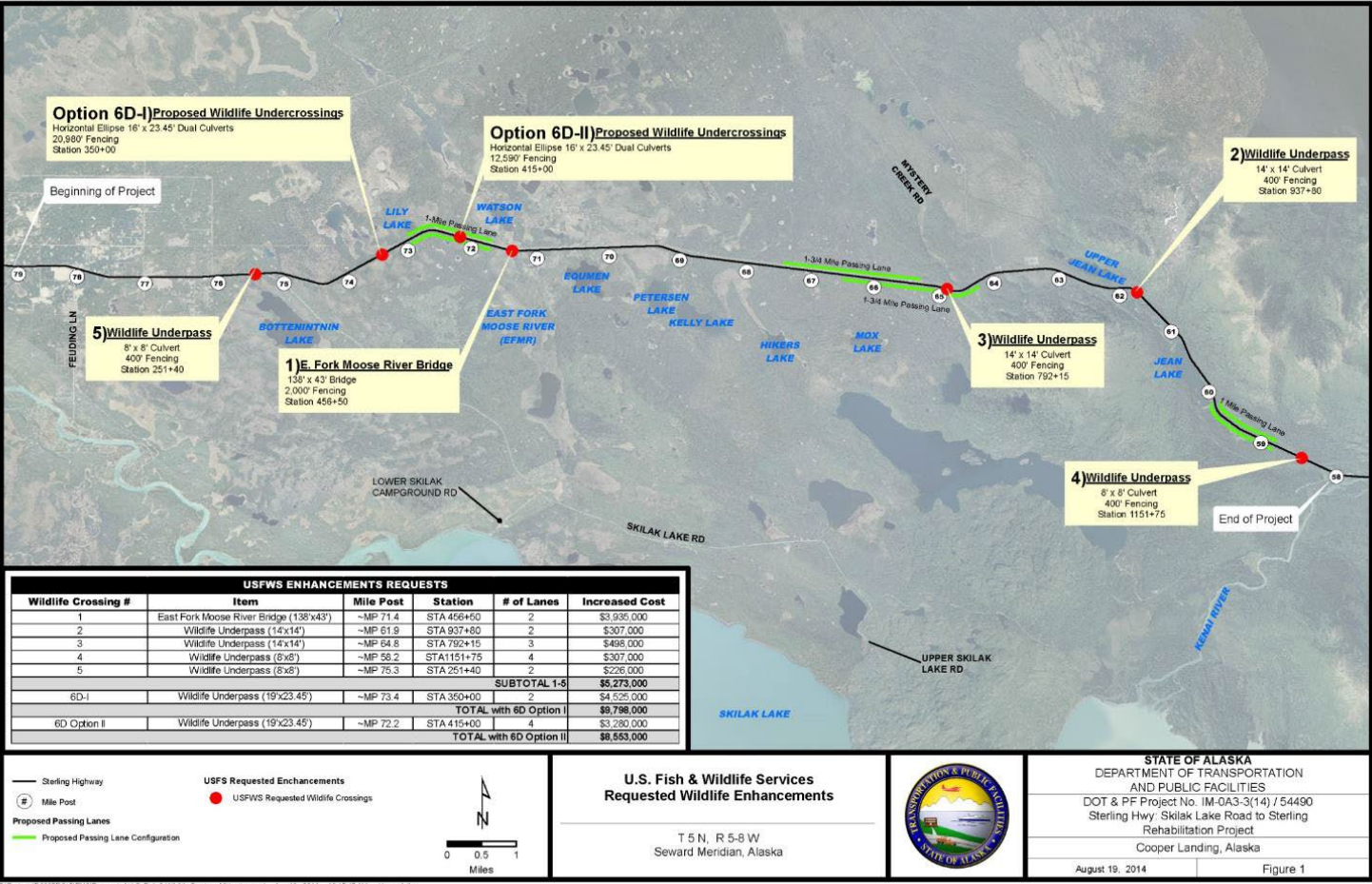


# Local Landscape Connectivity: Sterling Hwy MP 58-79



Only 3 landscape-scale corridors remain for north-south wildlife movement (<20% of area historically available)

# Local Landscape Connectivity: Sterling Hwy MP 58-79



**MP 64.8**

Project: 0001516200 Requested U.S. Fish & Wildlife Services Magazine.mxd Aug 19, 2014 10:15:43 AM User: chelak

# Local Landscape Connectivity: Sterling Hwy MP 58-79

## East Fork of Moose River

OLD 10' culvert



NEW 104' X 18' bridge





## Challenges

- Need venues for multi-jurisdictional planning
- Who is responsible for connectivity?

Connectivity allows plants and animals to respond autonomously to change