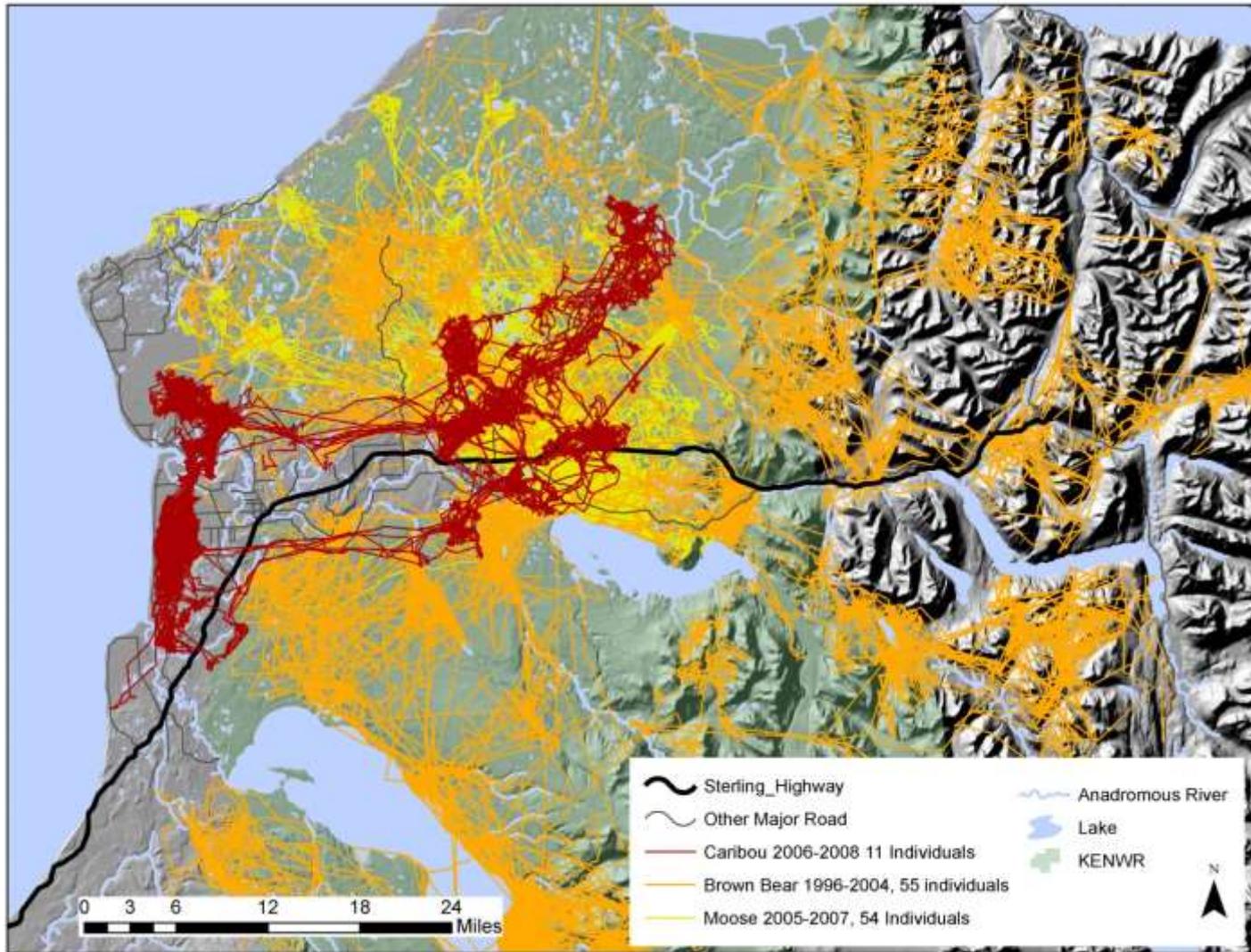


Why does the moose cross the road?

**Sterling Highway MP 58-79 Rehabilitation
Jim's Landing to Sterling**

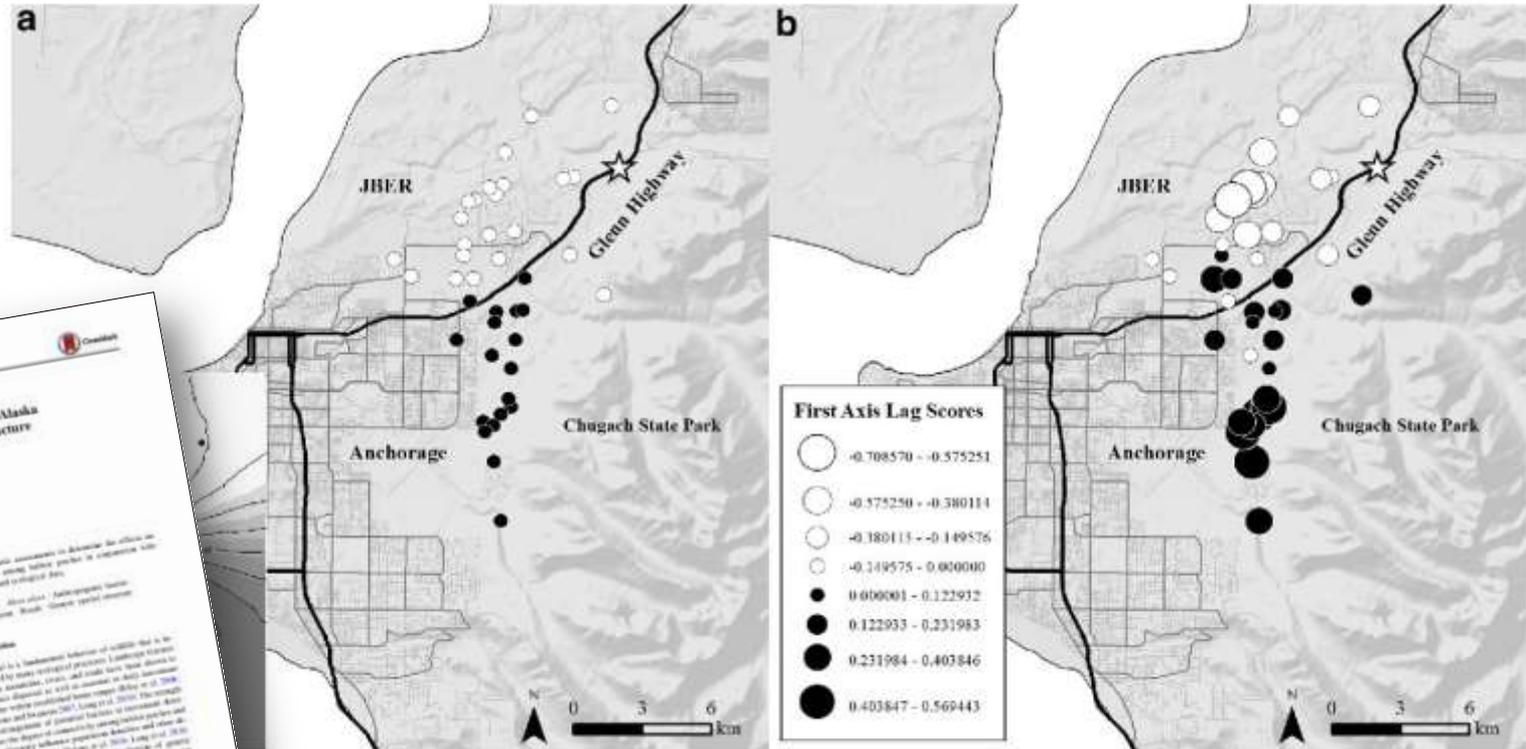
**John Morton
Kenai National Wildlife Refuge**





Movements of caribou (n =11), brown bear (n=55) and moose (n = 54). Wildlife avoid the Sterling development corridor

Glenn Highway divides Anchorage moose into 2 genetically distinct subpopulations



A genetic discontinuity in moose (*Alces alces*) in Alaska corresponds with fenced transportation infrastructure

Robert D. White, Juan D. Taylor, Thomas J. McManis, Susan L. Tallon, Perry S. Barbra

Journal of Heredity 2017, Volume 108, Number 1, 1-10

Abstract The arrival and expansion of fenced infrastructure (e.g., roads and fences) has altered the genetic structure of moose (*Alces alces*) in Alaska. Using genetic data, we evaluated the genetic structure of moose across the state of Alaska. We found evidence of a genetic discontinuity in moose across the Glenn Highway, a major transportation corridor that divides the state of Alaska. This discontinuity was associated with the presence of fenced infrastructure, including roads and fences, which likely restricts gene flow between populations on either side of the highway. Our findings suggest that the Glenn Highway acts as a genetic barrier, dividing moose into two genetically distinct subpopulations. This study highlights the importance of considering the effects of human infrastructure on wildlife genetic diversity and conservation.

Keywords: *Alces alces*; landscape genetics; population structure; genetic diversity

Introduction

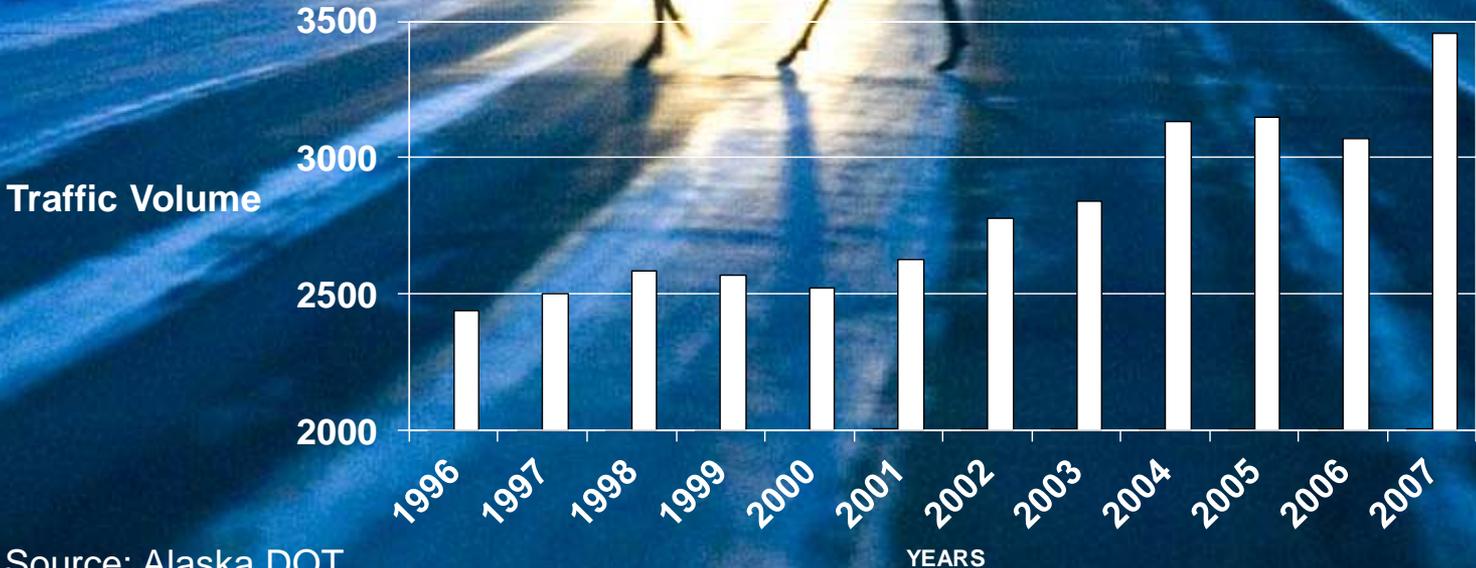
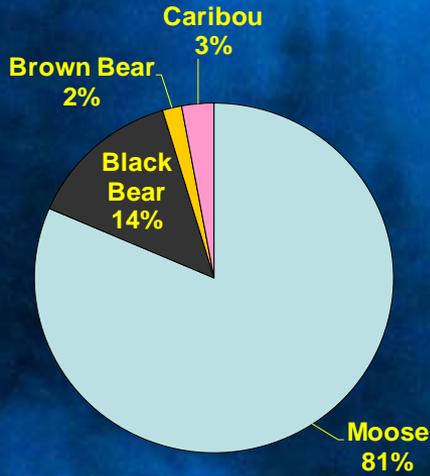
Human activities are strongly linked to genetic structure in many species, including moose (*Alces alces*). The arrival and expansion of fenced infrastructure, such as roads and fences, has altered the genetic structure of moose in Alaska. This study highlights the importance of considering the effects of human infrastructure on wildlife genetic diversity and conservation.

- based on microsatellite allelic frequency

WILDLIFE-VEHICLE COLLISIONS

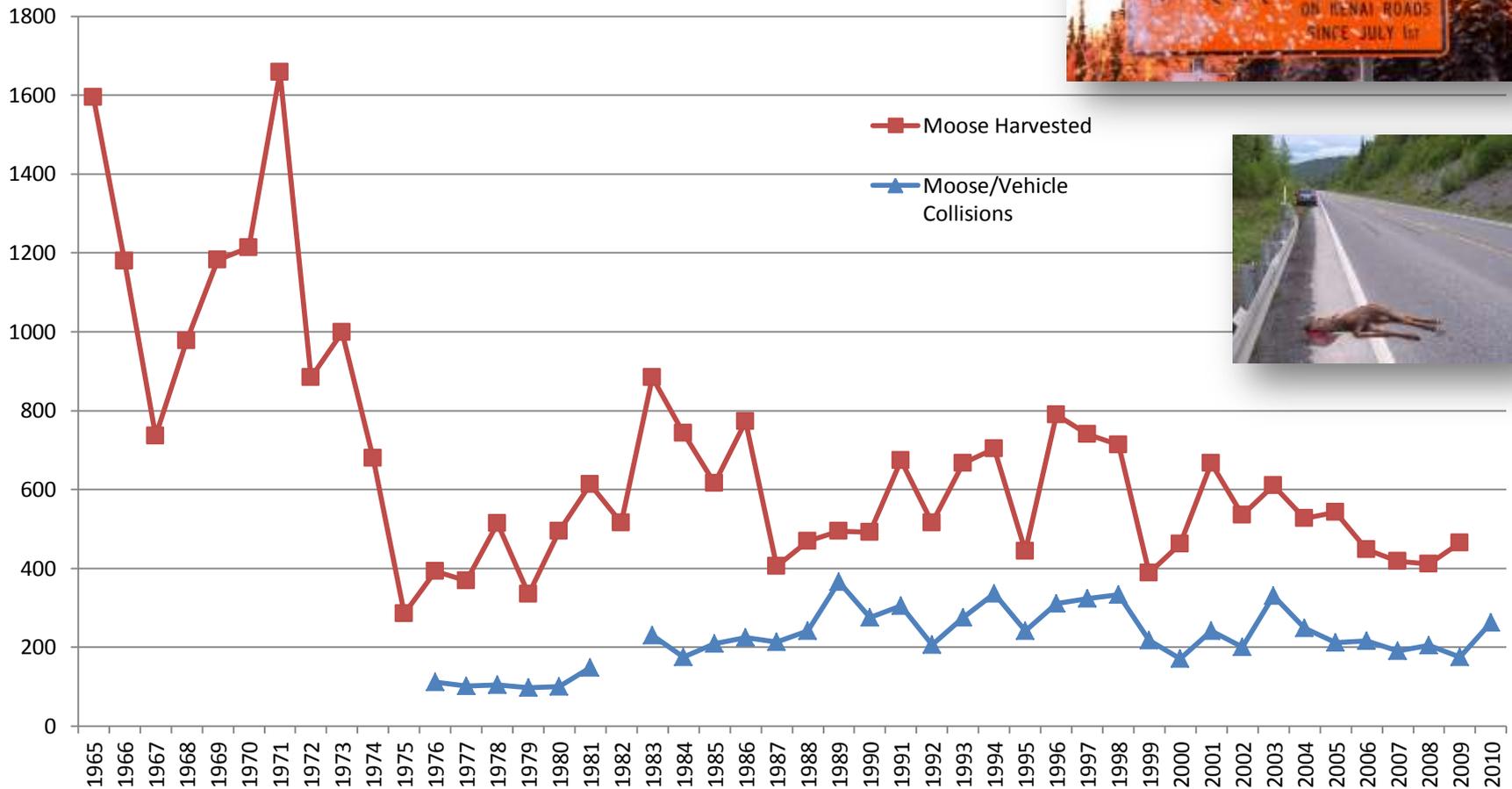
Sterling Highway MP 58 – 79
2000 to 2007 (n = 168)
22.4 WVC/year

Source: Alaska State Troopers



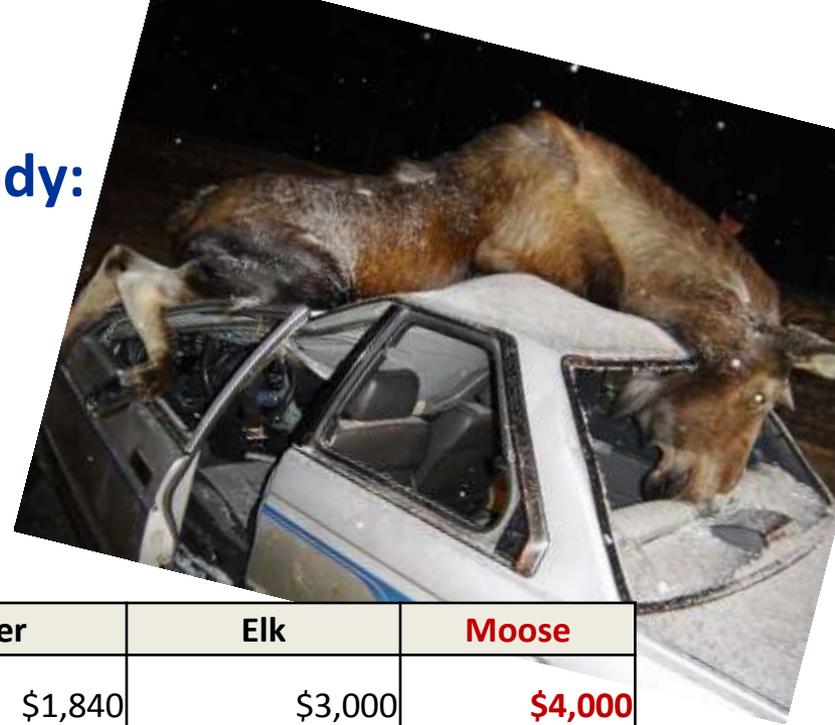
Source: Alaska DOT

Vehicle collisions kill half as many moose (~250) as harvested by hunters (~500)



Wildlife-Vehicle Collision Reduction Study: Report To Congress, FHWA 2008

**> \$7.75 million per year
on Kenai Peninsula!**



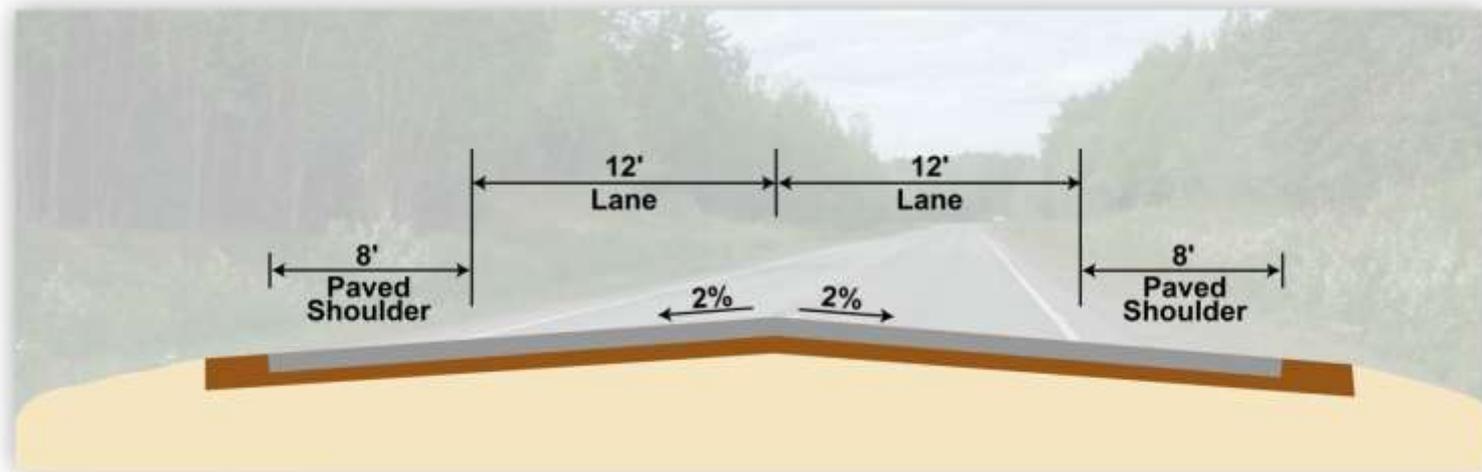
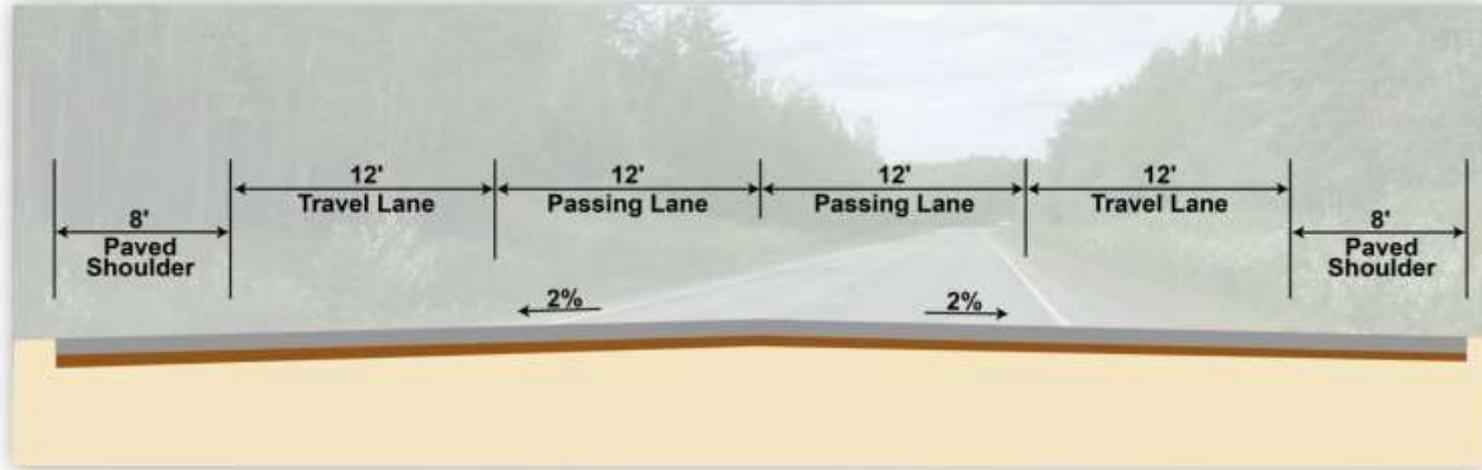
	Deer	Elk	Moose
Vehicle repair costs per collision	\$1,840	\$3,000	\$4,000
Human injuries per collision	\$2,702	\$5,403	\$10,807
Human fatalities per collision	\$1,671	\$6,683	\$13,366
Towing, accident attendance and investigation	\$125	\$375	\$500
Monetary value animal per collision	\$2,000	\$3,000	\$2,000
Carcass removal and disposal per collision	\$50	\$100	\$100
TOTAL	\$8,388	\$18,561	\$30,773

Project Components

- Repave the existing highway
- Construct passing lanes
- Widen highway shoulders
- Improve drainage
- Maintain 55 mph posted speed
- Wildlife enhancement features



Typical Section



Wildlife Undercrossings

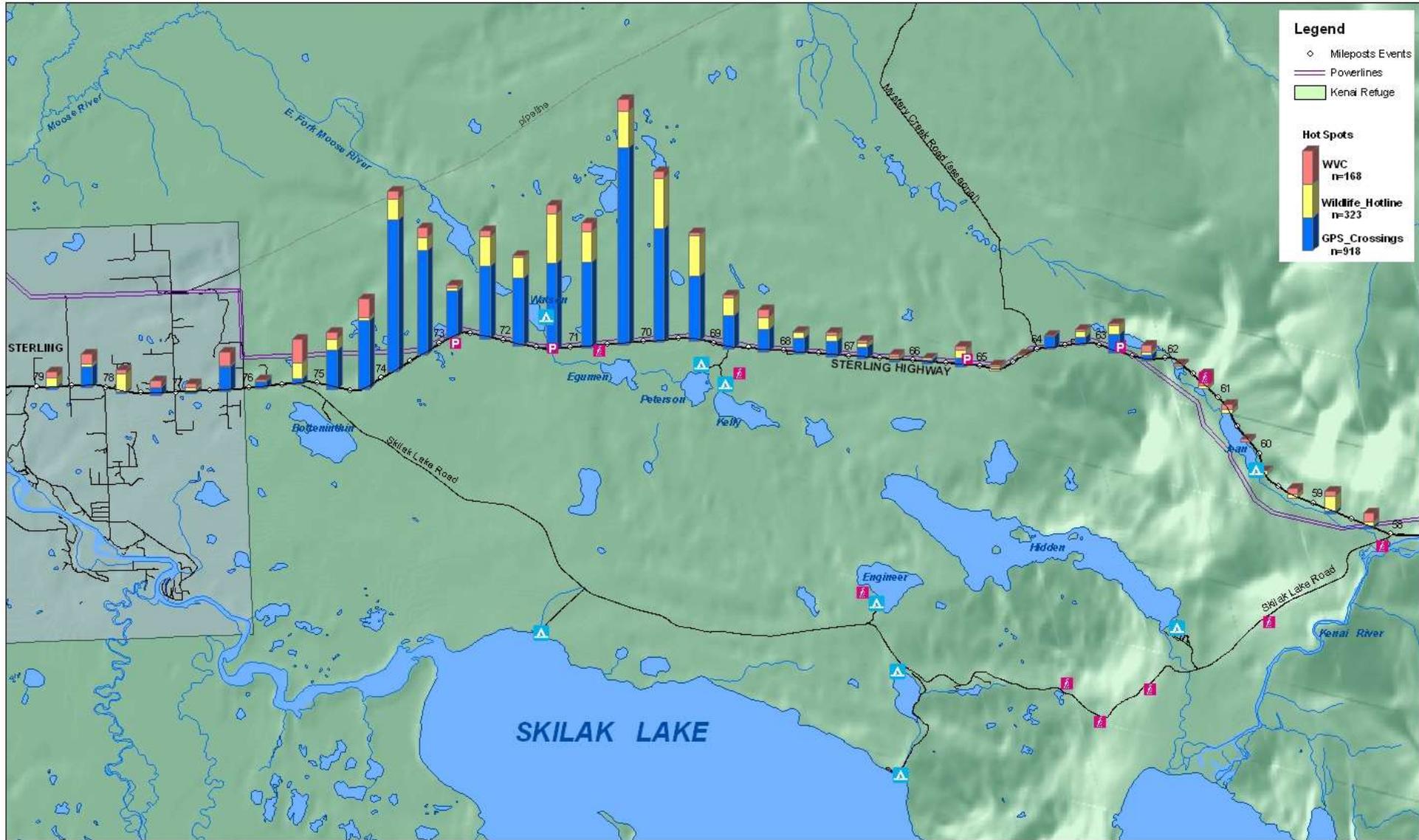


STERLING HIGHWAY MP58-79 PROJECT

Interagency Working Group
Kenai Peninsula, Alaska

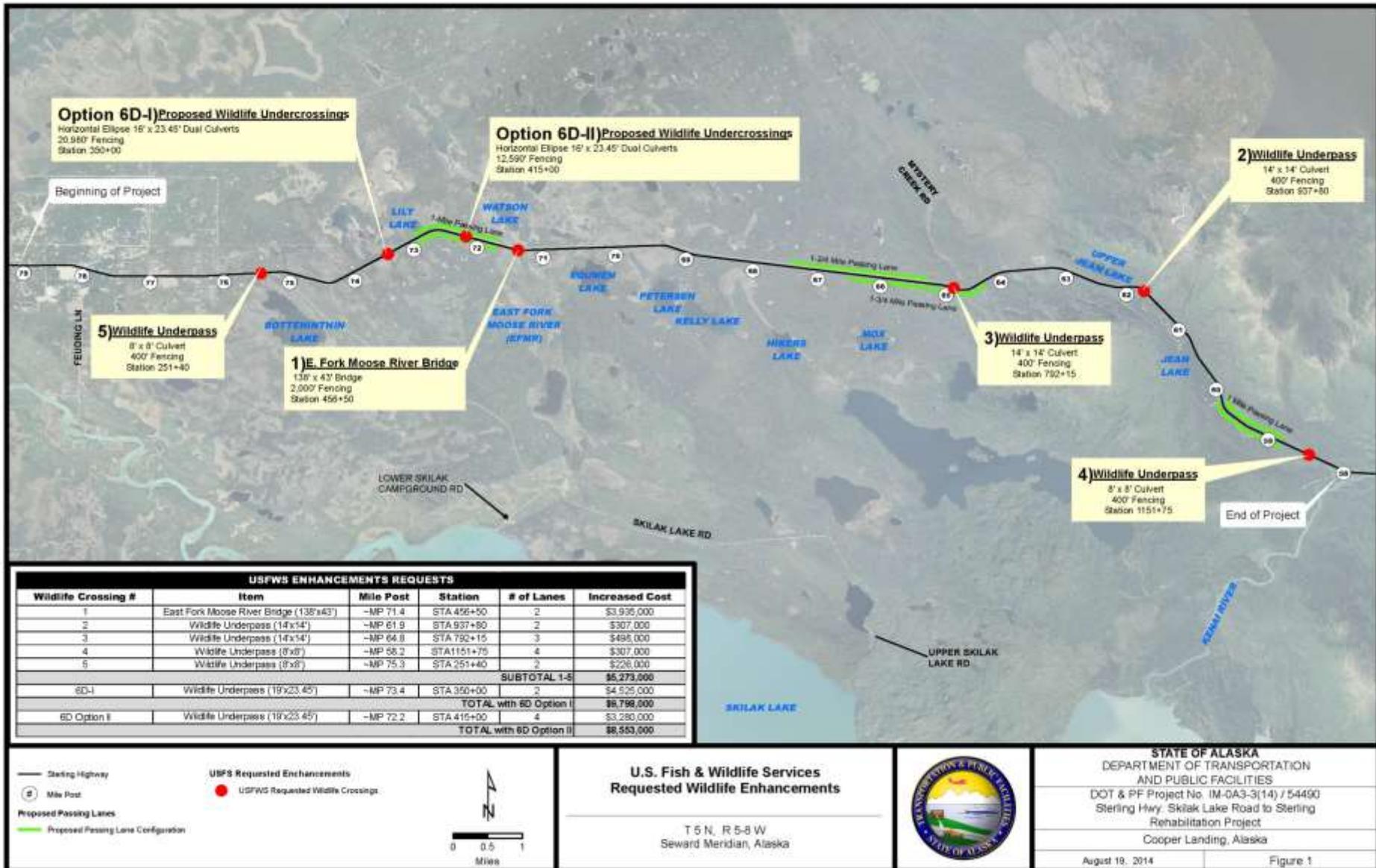


SEGMENTS OF HIGHEST CONCERN
Total WV Collisions, Hotline Sightings, and GPS Crossings

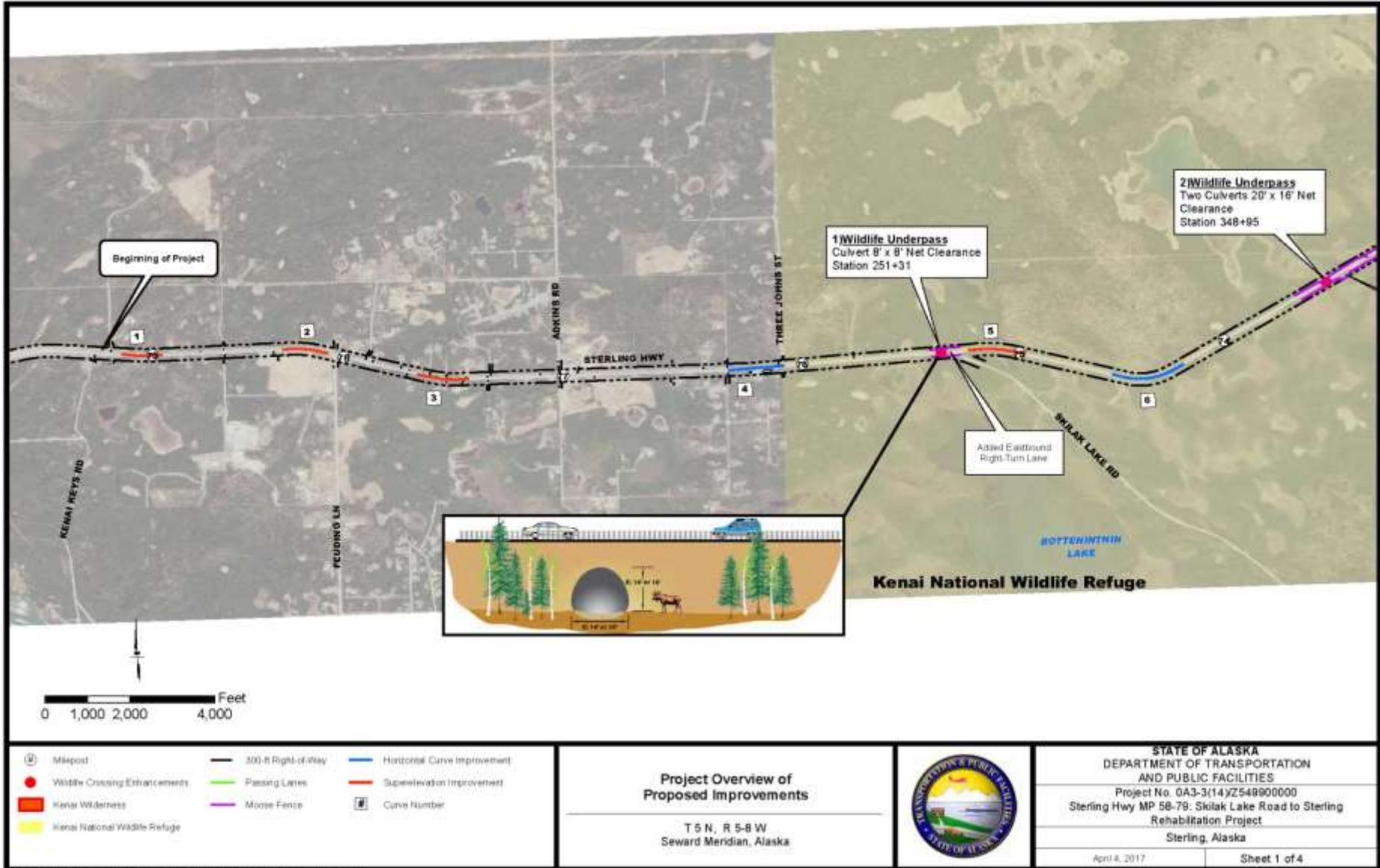


Map 3. Hot spots (sum of WV Collisions, Wildlife Hotline, and GPS Crossings) along the Sterling Highway.

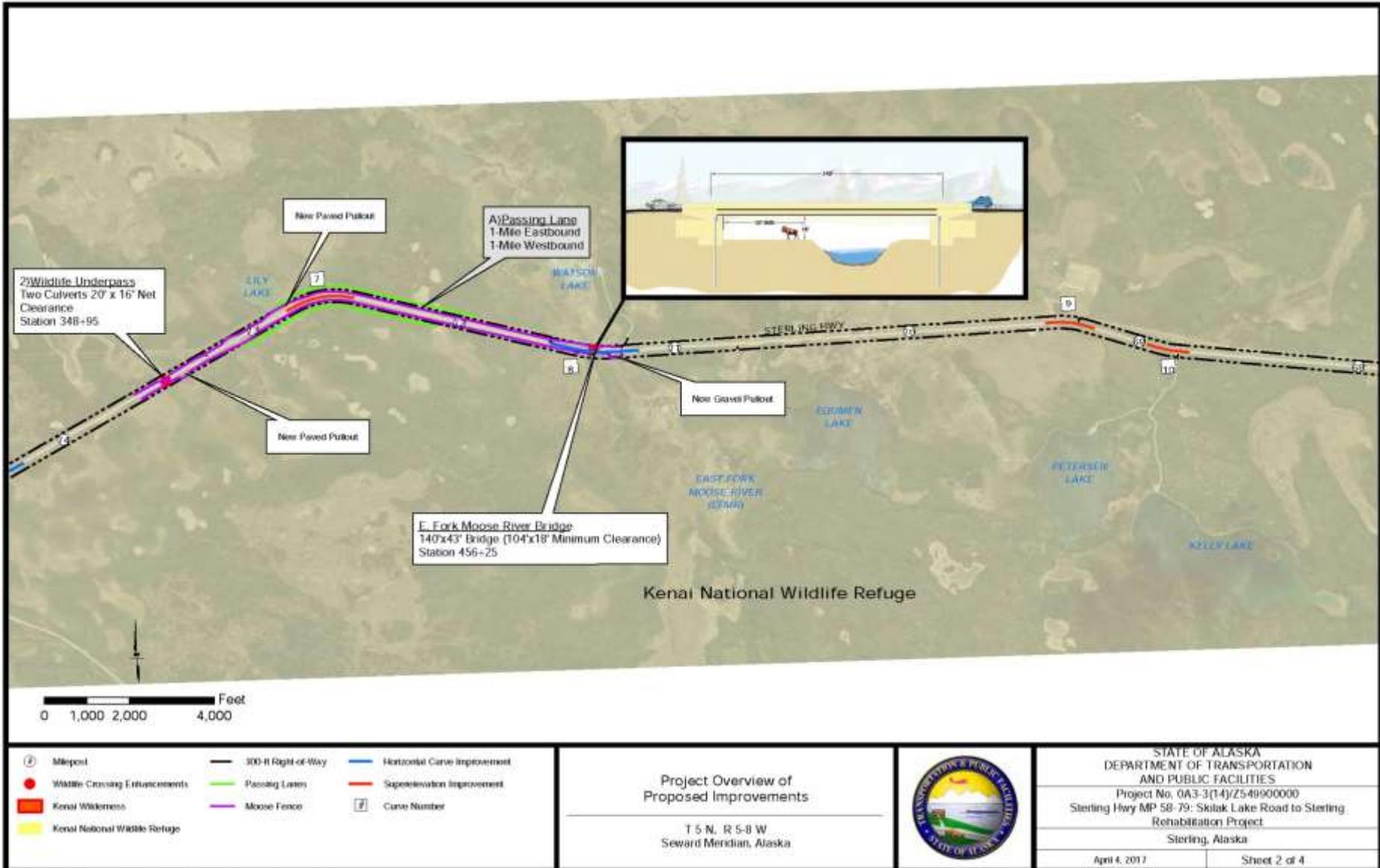




MP 75.3 8'x8' underpass

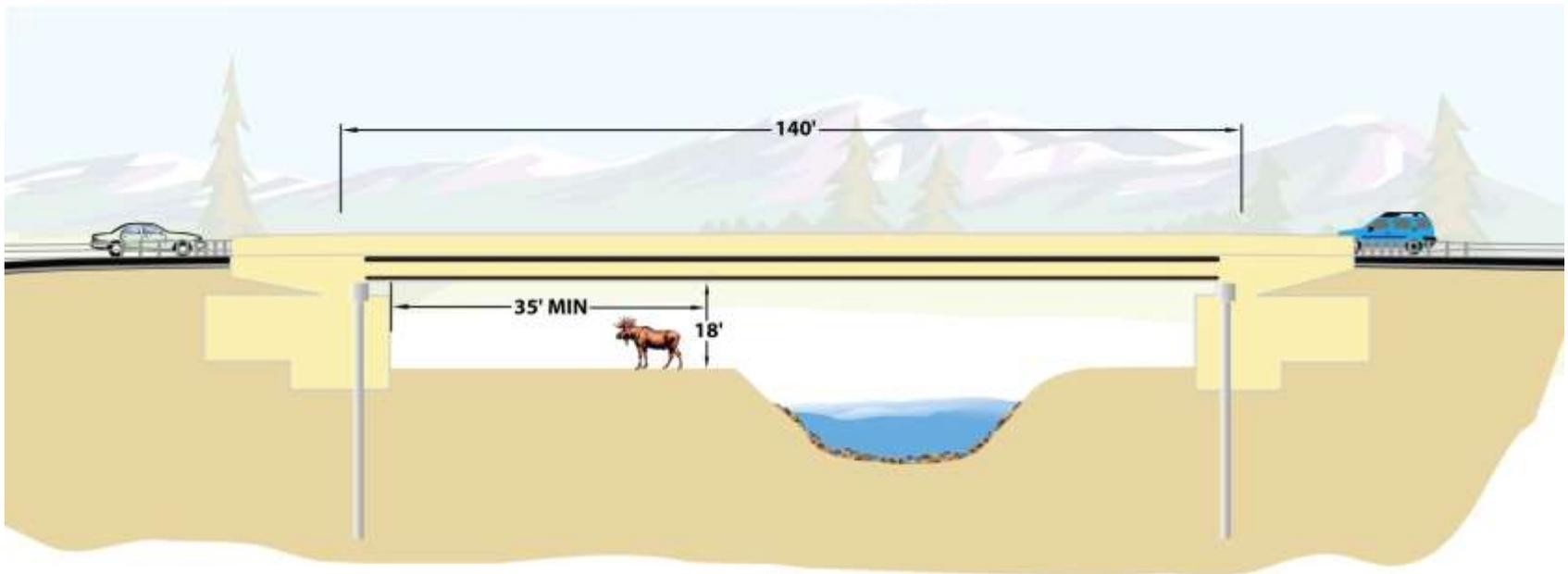


MP73.4 20'x16' underpasses (2), EFMR 104'x18' bridge



East Fork Moose River

- 104' X 18' clearance
- $\geq 35'$ bank for wildlife

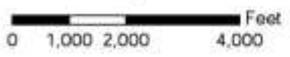
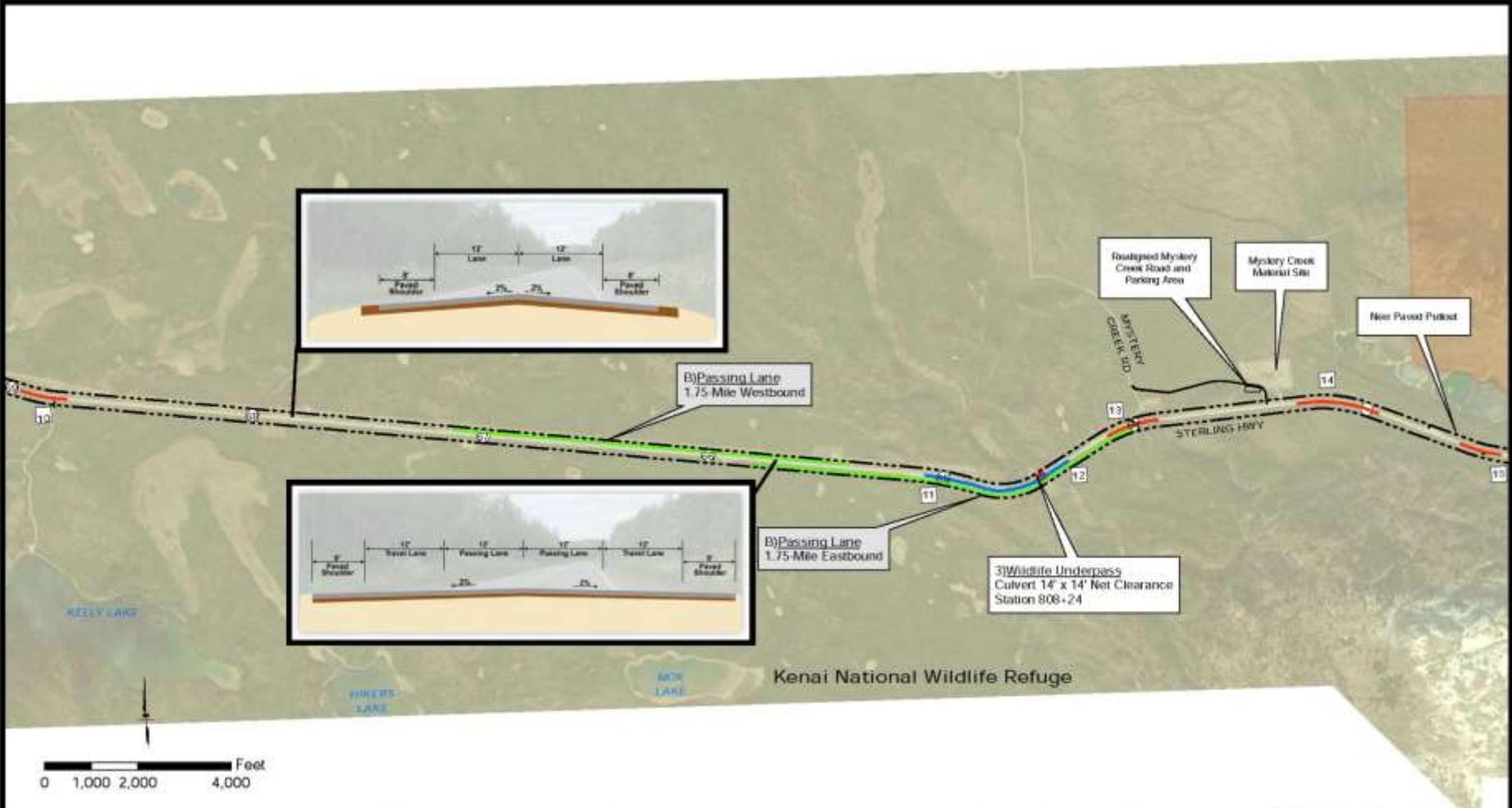


Moose Fence

- 2.3-mile (x2) fence 9' tall with 1' gap at bottom
- 22 jump outs alternating every 1/8 miles



MP 64.8 14'x14' underpass



Milepost	300-ft Right-of-Way	Horizontal Curve Improvement
Wildlife Crossing Enhancements	Passing Lanes	Superelevation Improvement
Kenai Wilderness	Moose Fence	Curve Number
Kenai National Wildlife Refuge		

Project Overview of Proposed Improvements
 T 5 N, R 5-8 W
 Seward Meridian, Alaska



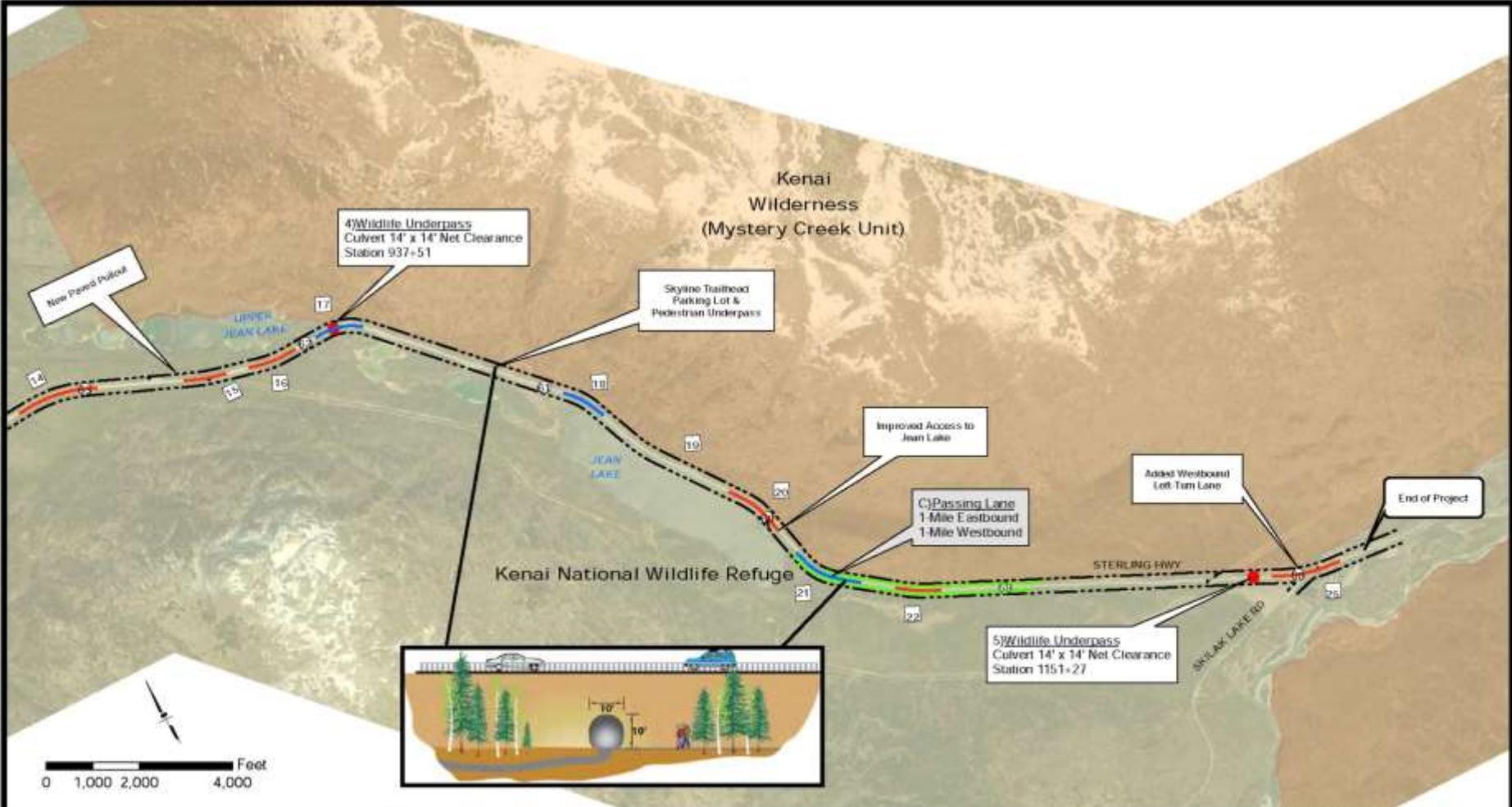
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 Project No. 0A3-3(14)/Z549900000
 Sterling Hwy MP 58-79: Skilak Lake Road to Sterling
 Rehabilitation Project
 Sterling, Alaska

Mystery Creek Road/Gravel Pit

- Extract 5.5 acres gravel from existing MP 63.4 material pit
- Realign road through gravel pit to improve safety/provide parking area
- Existing road access closed and partially reclaimed
- Spruce saplings translocated by YCC for reclamation



MP 61.9, 58.2 14'x14' underpasses



- M Milepost
- Wildlife Crossing Enhancements
- Kenai Wilderness
- Kenai National Wildlife Refuge
- 300-ft Right-of-Way
- Passing Lanes
- Moose Fence
- Horizontal Curve Improvement
- Speed Limit Improvement
- F Curve Number

Project Overview of Proposed Improvements

T 5 N, R 5-8 W
Seward Meridian, Alaska



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
Project No. 0A3-3(14)/Z548900000
Sterling Hwy MP 58-79: Skilak Lake Road to Sterling
Rehabilitation Project
Sterling, Alaska

Additional Components

- Mystery Creek realignment/gravel pit restoration
- Skyline Trail pedestrian underpass/kiosk
- New paved pullouts at Lily Lake and MP 73.4
- Paving pullout at MP 62.7
- Turn lanes at Skilak Lake Road intersections
- Improved access road to Jean Lake
- Fish habitat in revetment along Kenai River braid at MP 57.8
- Improved hydrologic connectivity

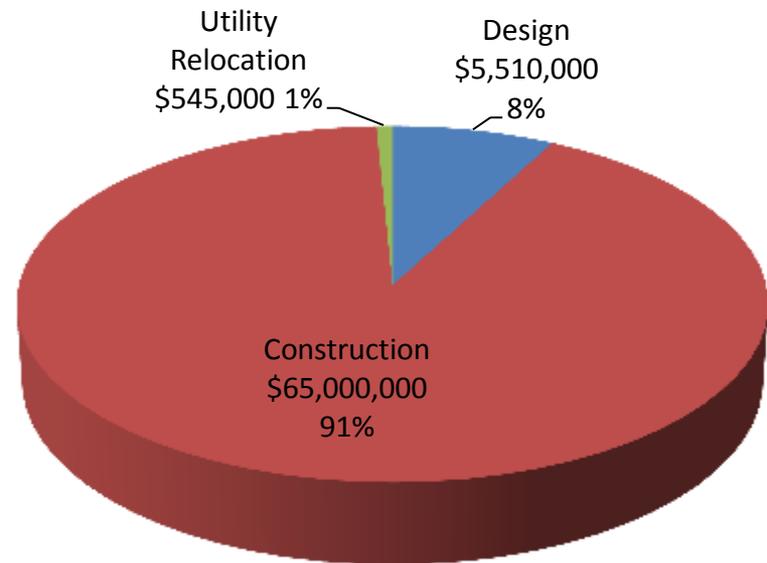


\$10.5 million wildlife mitigation

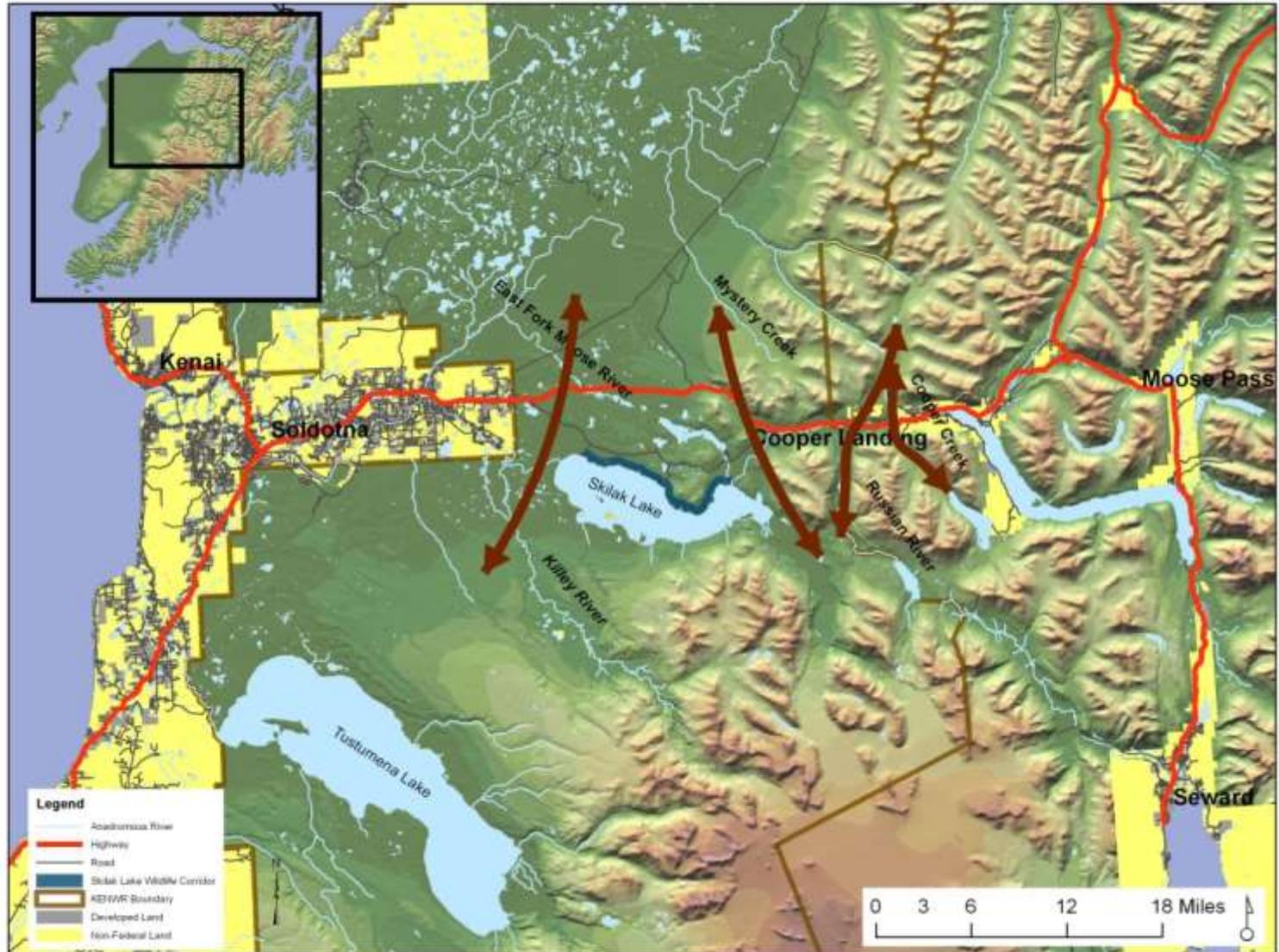
Milepost	Structure (net clearance)	Cost
75.3	structural plate pipe-arch 8' X 8'	\$550,410
73.4	structural plate horizontal ellipse 20' X 16'	\$1,255,690
	structural plate horizontal ellipse 20 X 16'	
	additional fill for 6a and 6B (~ 20,000 yd ³)	\$508,405
71.4	East Fork Moose River bridge (104' X 18')	\$2,473,104
64.8	structural plate underpass 14' X 14'	\$957,183
61.9	structural plate underpass 14' X 14'	\$572,740
58.2	structural plate underpass 14' X 14'	\$627,661
	retaining walls for wildlife undercrossings	\$718,189
	cast-in-place retaining wall (Jean Lake)	\$1,752,622
71.3-73.6	moose fence, 9' high,	\$487,041
	22 jump-outs	\$398,323

MP 58–79 project total cost \$71 million (bid amount)

- 93.4% Federal funds
- \$10.5 million wildlife mitigation
 - \$1.5 million NWRS-WO funds
 - \$1.3 million gravel
- \$0.6 million Skyline Trail underpass
 - \$1 million FLAP grant



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



Partnership and Collaboration!



THANK YOU



U.S. Department
of Transportation

**Federal Highway
Administration**

