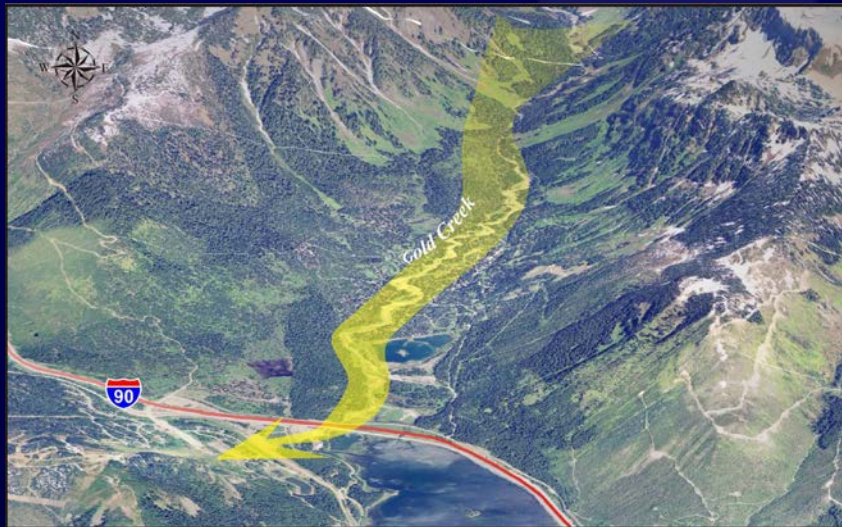
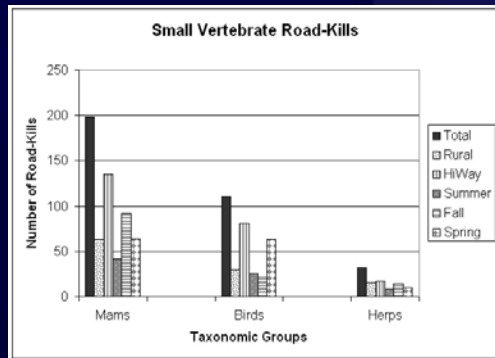
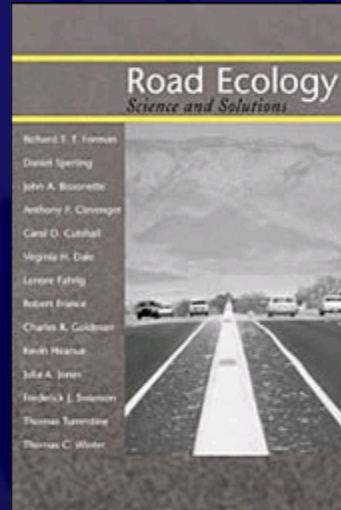


Monitoring the Effectiveness of Wildlife Crossing Structures: The I-90 Snoqualmie Pass East Project

Robert A. Long, Anthony P. Clevenger, Rob Ament
Western Transportation Institute, Montana State University



Road Ecology



Mitigating Road Effects and Increasing Road Permeability



Objectives of Presentation

- Introduce the I-90 Snoqualmie Pass East project
- Describe the associated Wildlife Monitoring Plan developed by Western Transportation Institute
- Summarize the initial pre-construction monitoring scheduled for 2008

Tony Clevenger



SNOQUALMIE PASS EAST

A safer, more efficient six-lane freeway from Hyak to Keechelus Dam

**Improve
Safety**



**Increase
Capacity**



**Replace
Pavement**



**Reduce
Avalanche
Closures**



**Stabilize
Slopes**

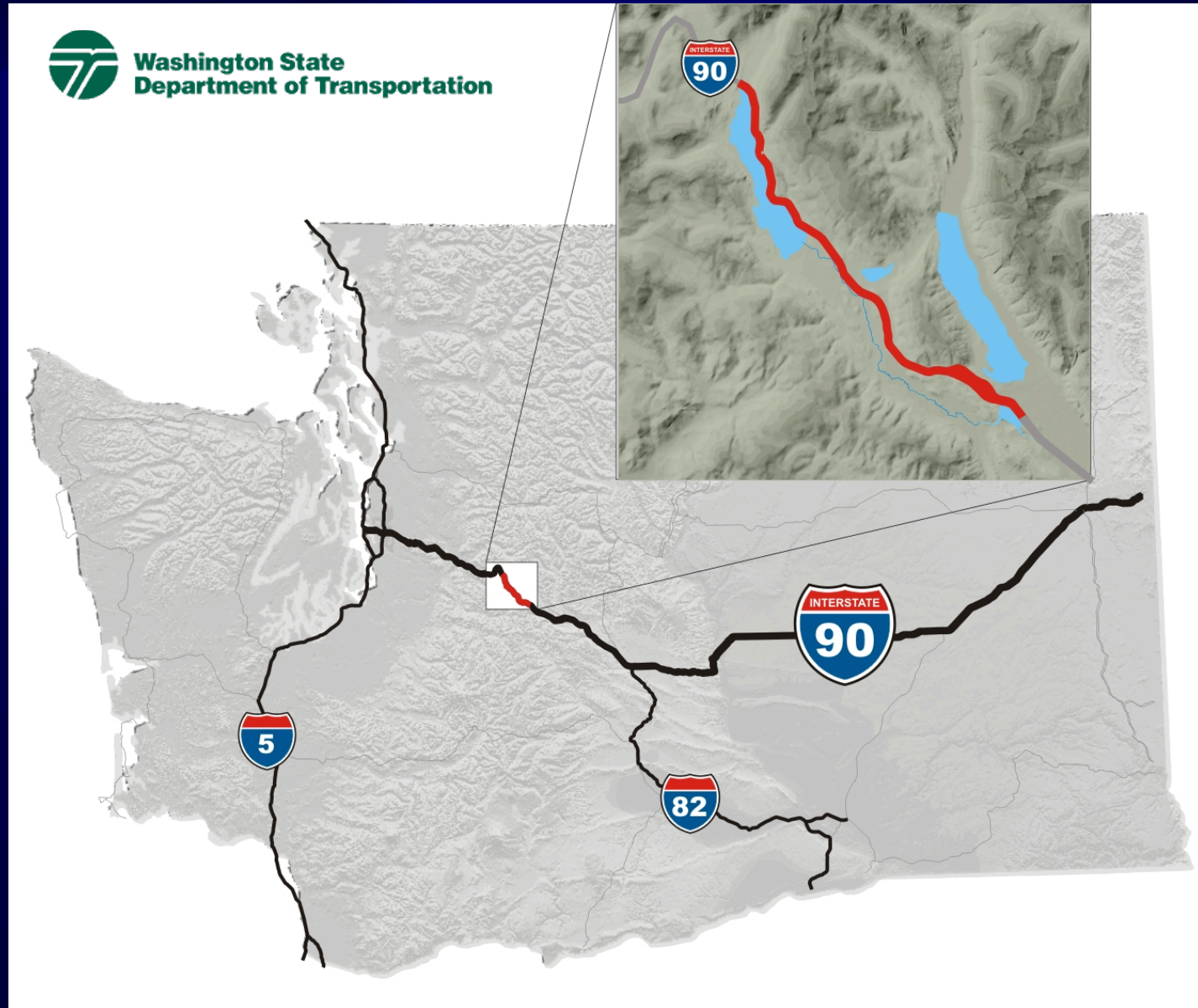


**Enhance
Wildlife
Connectivity**





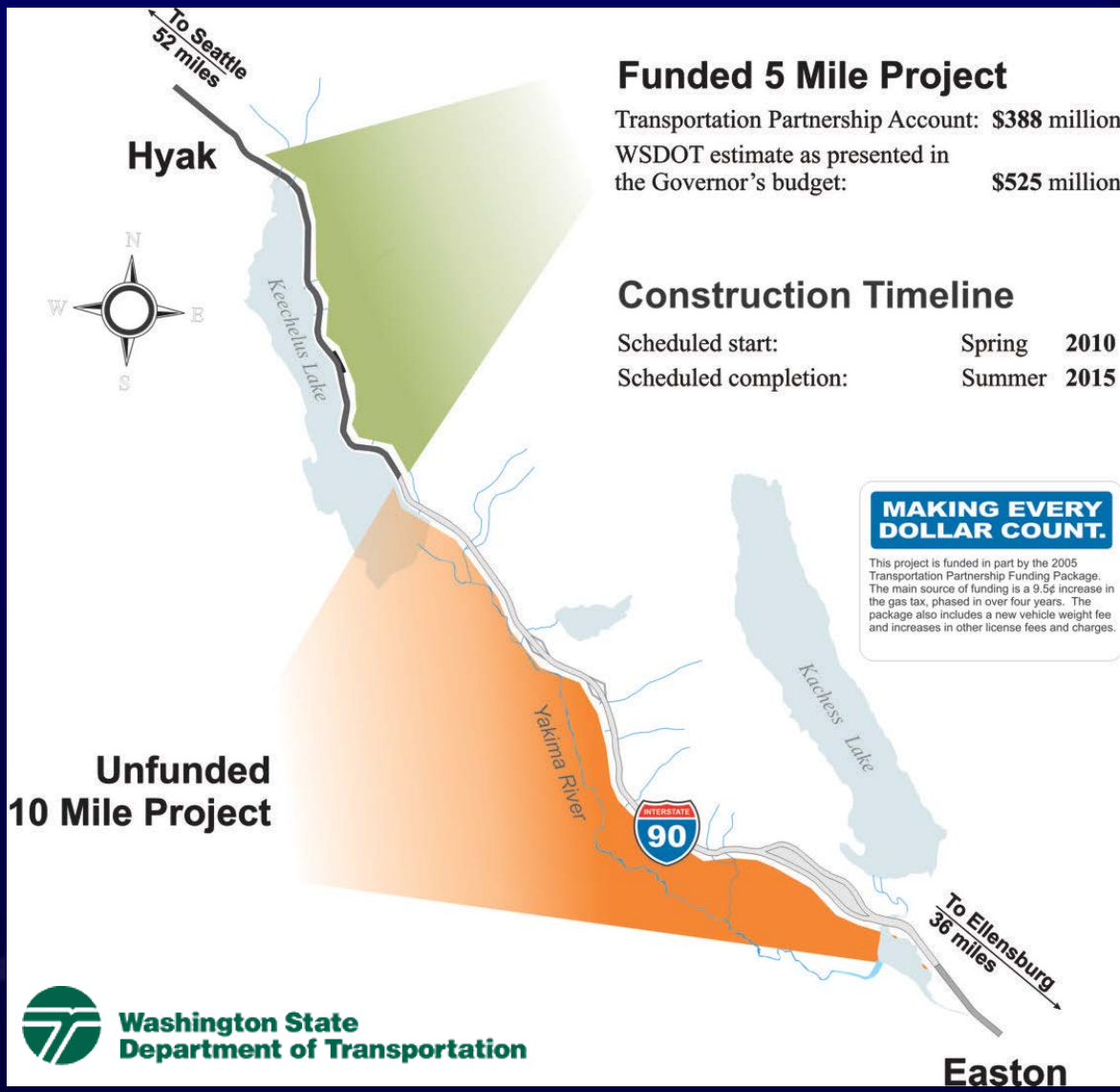
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SNOQUALMIE PASS EAST

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“Purpose and Need” statement of the project specifically includes “**Ecological Connectivity**”

I-90 Snoqualmie Pass East

Hyak to Easton - 15 Mile Corridor



Design Visualization
Gold Creek



Design Visualization
Rock Knob



Legend

- | | | | |
|---|-------------------------------|---|-----------------------------|
|  | Funded (6-lane Highway) |  | Extended Chain-On/Off Areas |
|  | Unfunded (6-lane Highway) |  | Connectivity Emphasis Areas |
|  | Extended Truck-Climbing Lanes |  | Avalanche Fencing |
|  | Unstable Slopes |  | Avalanche Zones |
|  | Stabilized Slopes | | |





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Context Sensitive Solutions - Habitat Connectivity



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Assessing “Ecological Connectivity”



Requires monitoring

Are Connectivity Measures Helping to Increase Permeability for Wildlife?

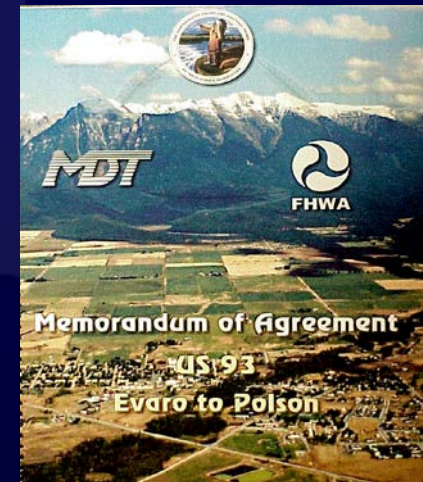


What Does Western Transportation Institute (WTI) Bring to the Project?

- Founded at Montana State University in 1994
- USDOT University Transportation Center
- 85 multi-disciplinary staff and students
- Projects in 35 states and Canada
- Road Ecology program



Trans-Canada Highway, Banff National Park, Alberta



US-93, Montana

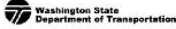
WTI's Role in Snoqualmie Pass


- Develop a wildlife monitoring plan that includes both pre- and post-construction components.
- Design and conduct pre-construction (and ultimately post-construction) wildlife monitoring.
- Help to coordinate wildlife research efforts within the I-90 Snoqualmie Pass East corridor.
- Develop partnerships and assist with project development and the identification of funding opportunities for research.

Definitions




- Crossing structures – overpasses or underpasses that can be used by wildlife to cross the highway.
- Connectivity measures – crossing structures, fencing, jump-outs.
- Pre-construction/post-construction – periods corresponding to before and after connectivity measures are implemented.
- Wildlife fencing – fencing designed to keep animals from entering the roadway.
- Jump-outs – structures to enable animals that have penetrated the fencing to escape the roadway.

Snoqualmie Pass East Wildlife Monitoring Plan

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Department of Transportation

 I-90 Snoqualmie Pass East

I-90 Snoqualmie Pass East Wildlife Monitoring Plan



Rendering courtesy WSDOT

February 2008

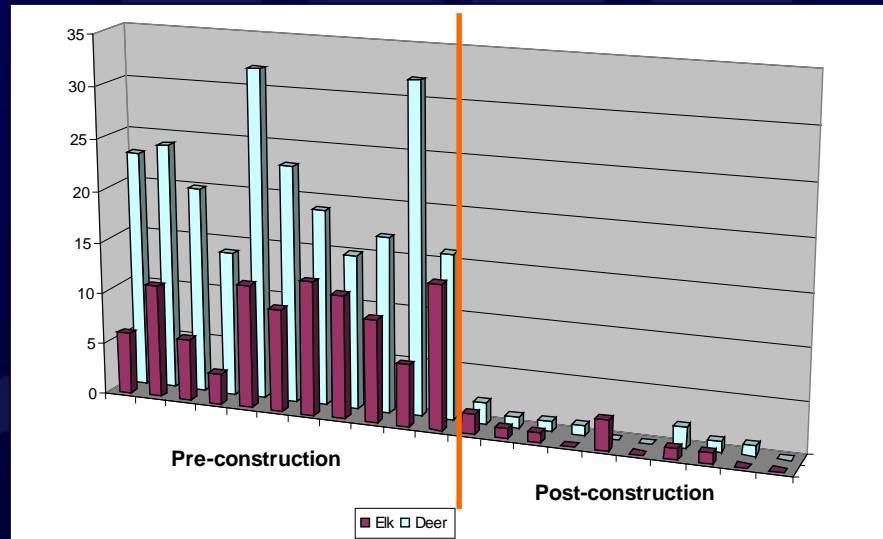
Snoqualmie Pass East Wildlife Monitoring Plan

- Focused on multiple species groups and community types



Snoqualmie Pass East Wildlife Monitoring Plan

- Focused on multiple species groups and community types
- Includes both pre- and post-construction components

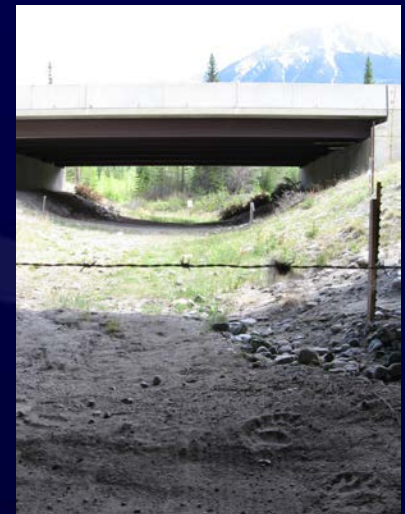


Snoqualmie Pass East Wildlife Monitoring Plan

- Focused on multiple species groups and community types
- Includes both pre- and post-construction components
- Takes a “tiered” approach

Snoqualmie Pass East Wildlife Monitoring Plan

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- Takes a “tiered” approach
- Employs cutting edge methods



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Tiered Objectives

Tier 1—Performance of connectivity measures

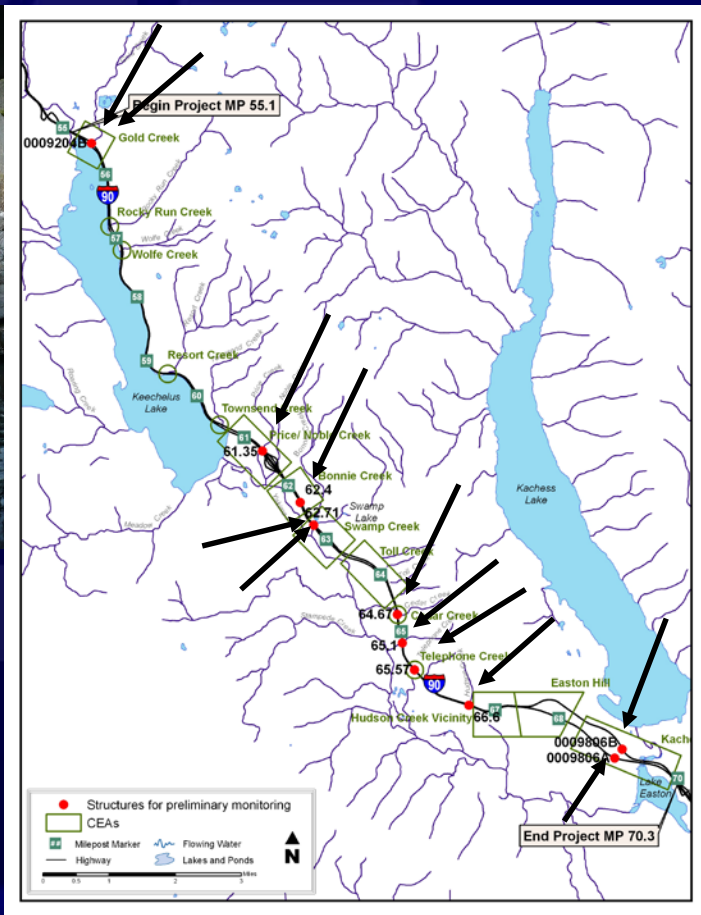
- Are crossing structures used by wildlife?
- Are highway crossing rates higher after structures are installed?
- Are wildlife-vehicle collisions (WVCs) reduced?
- Are structures designed appropriately?
- Do fencing and jump-outs perform as expected?

Tier 2—Regional in scale or broad in scope

- How does increased permeability affect demographic and genetic connectivity for wildlife?
- Are habitats recolonized?
- Is population viability enhanced?
- What are the Cascade-wide effects on wildlife populations?

2008 Pre-construction Monitoring

- Remote camera monitoring of 12 existing structures



2008 Pre-construction Monitoring

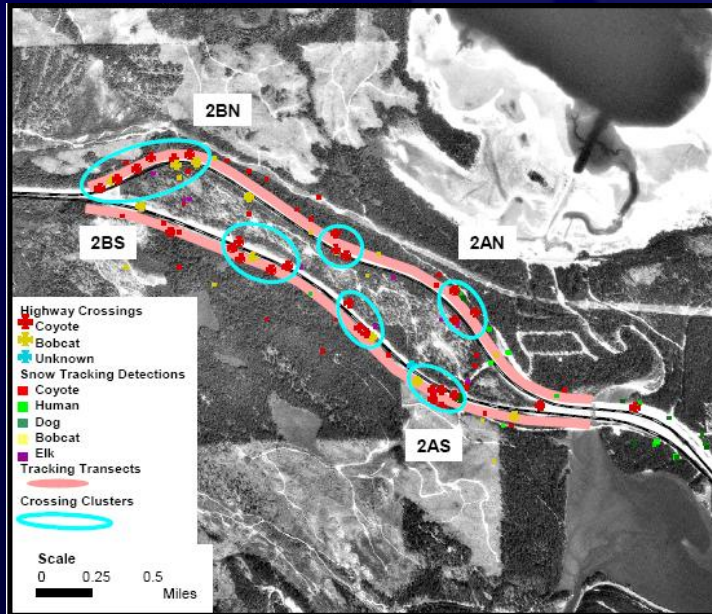
- Remote camera monitoring of existing structures
- Roadkill recording by WSDOT personnel and ROCS PDA/software units



2008 Pre-construction Monitoring

- Remote camera monitoring of existing structures
- Roadkill recording by WSDOT personnel and ROCS
- Snow tracking to assess road crossings

Baseline crossing indices



2008 Pre-construction Monitoring

- Remote camera monitoring of existing structures
- Roadkill recording by WSDOT personnel and ROCS
- Snow tracking to assess road crossings
- Detection stations and live-trapping



2008 Pre-construction Monitoring

- Collaboration with Central Washington University for baseline monitoring of fish and lower mobility species



Photo: Jackie Morris



Thank you!