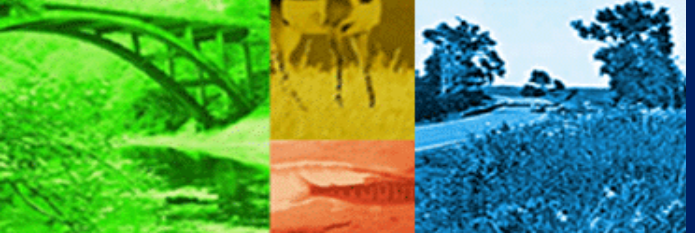


Eco-Logical
Community of Practice

Wildlife and Transportation

Presenters:

Kate Kurgan, American Association of State Highway Transportation Officials

David Williams, Federal Highway Administration

Daniel Buford, Federal Highway Administration

Kris Gade and Justin White, Arizona Department of Transportation

David Singer, Colorado Department of Transportation

March 30, 2016

(Learn more about Eco-Logical at the FHWA website)

American Association of State Highway and Transportation Officials
AASHTO

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

U.S. Department of Transportation
Federal Highway Administration

Steps to Ensure Optimal Webinar Connection

This webinar broadcasts audio over the phone line and through the web room, which can strain some internet connections. To prevent audio skipping or webinar delay we recommend participants:

- Close all background programs
- Use a wired internet connection, if possible
- Do not use a Virtual Private Network (VPN), if possible
- Mute webroom audio and use audio only (toggle is located at the top of the webroom screen)

SHRP2 & Its Focus Areas
(Second Strategic Highway Research Program)

Safety: Fostering safer driving through analysis of driver, roadway and vehicle factors in crashes, near crashes, and ordinary driving.

Renewal: Rapid maintenance and repair of the deteriorating infrastructure using already-available resources, innovations, and technologies.

Capacity: Planning and designing a highway system that offers minimum disruption and meets the environmental, and economic needs of the community.

Reliability: Reducing congestion and creating more predictable travel times through better operations.

Eco-Logical Starter Kit

Website on FHWA Review Toolkit

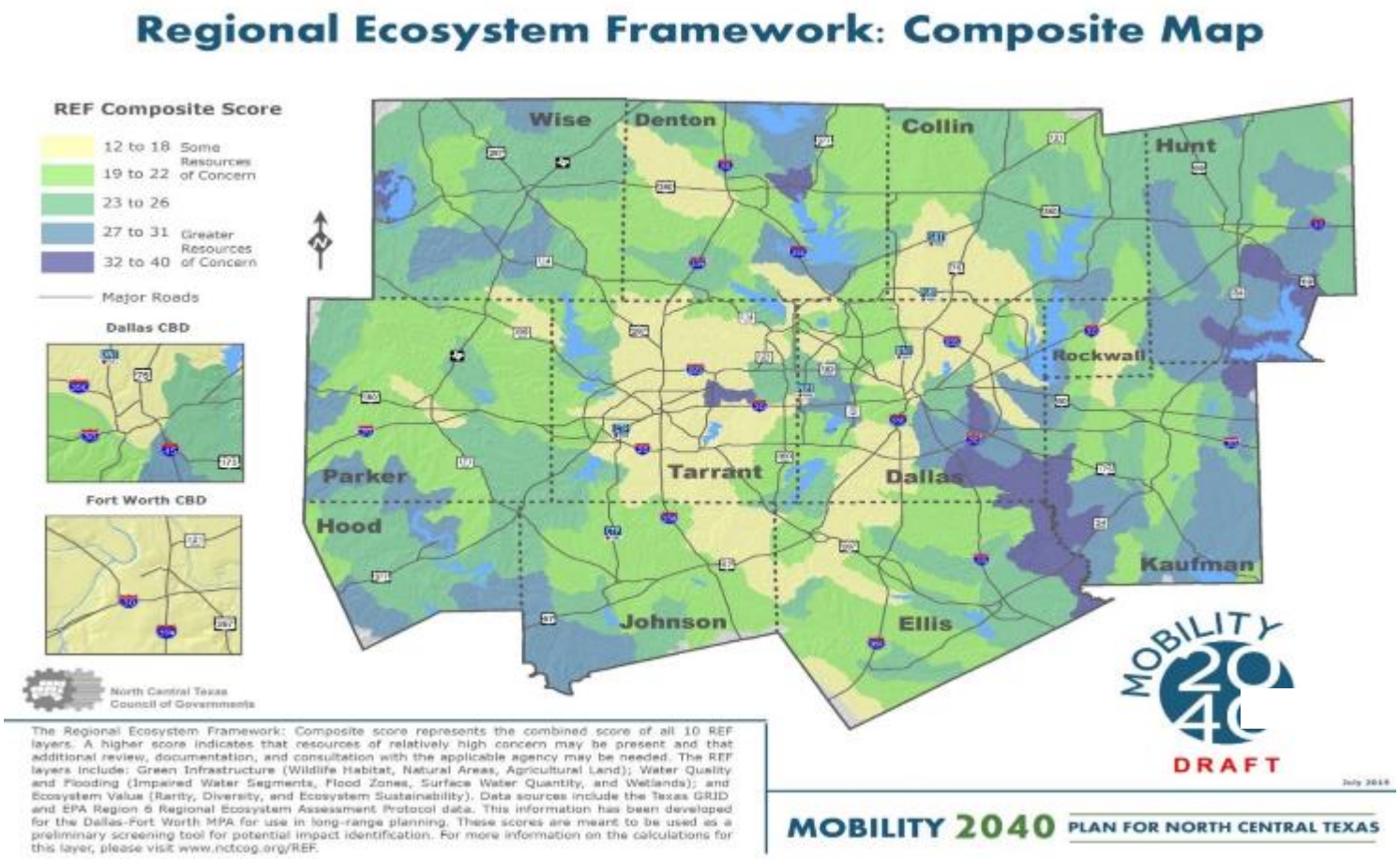
Eco-Logical Resources

https://www.environment.fhwa.dot.gov/ecological/ImplementingEcoLogicalApproach/default.asp

Regional Ecosystem Framework

- Eco-Logical focuses on an ecosystem-scale
- REF (Step 3) is a cornerstone of Eco-Logical approach
- Identifies resources, organizes needs and priorities by integrating resource data with transportation data
- Identifies avoidance, minimization, & mitigation options
- Prioritizes implementation options

REF Example: North Central Texas Council of Governments



Implementing Eco-Logical Steps

1. Build collaborative partnerships & vision
2. Characterize resource status
3. Create REF
4. Assess effects on conservation
5. Identify & Prioritize actions
6. Develop crediting strategy
7. Develop agreements
8. Implement agreements
9. Update REF over time

SHRP2 Implementation Strategies

- Strategy 1: Engage and educate agency leadership.
- Strategy 2: Develop incentives/support REF adoption.
- Strategy 3: Provide Technical assistance.
- Strategy 4: Develop a business case.
- Strategy 5: Develop new tools and technologies.
- Strategy 6: Develop communication and outreach materials

Eco-Logical Community of Practice

Purpose:

- To continue the exchange of information after SHRP2 activities have concluded.

Goals:

- To create a self-sustaining network of practitioners to share knowledge, best practices, ideas, and facilitate technical assistance amongst members
- To enlist Eco-Logical champions to support the Community of Practice

Contact Information

David Williams, FHWA

david.Williams@dot.gov

202-366-4074

Kate Kurgan, AASHTO

kkurgan@aashto.org

202-624-3635

Mike Ruth, FHWA

Mike.ruth@dot.gov

202-366-9509

REGULATORY SETTING

NEPA

Endangered Species Act

Migratory Bird Treaty Act

Bald and Golden Eagle Act

Fish and Wildlife Coordination Act

State Wildlife Laws

REGULATORY SETTING

NEPA

Clean Water Act

Rivers and Harbors Act

Wild and Scenic Rivers Act

Public Lands/Acts/4(f)

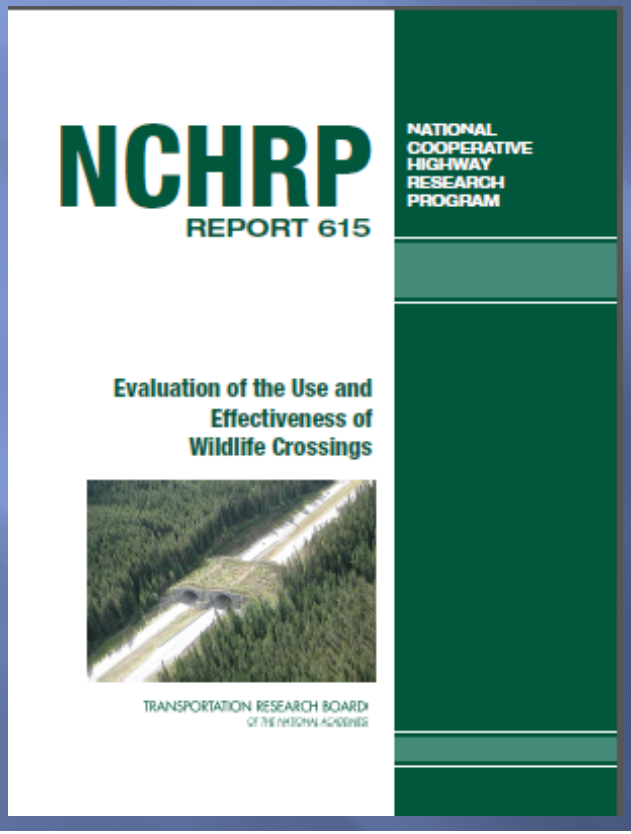
REGULATORY SETTING

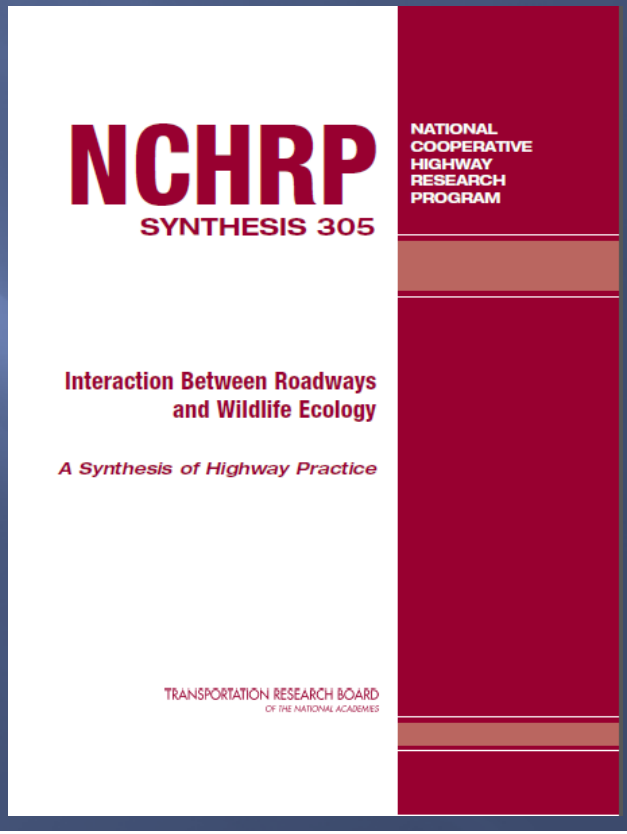
SAFETY

COST

GOOD STEWARDS

RESOURCES





TRB - National Cooperative Highway Research Program (NCHRP)
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_615.pdf
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_305.pdf

RESOURCES

Committee on Ecology and Transportation Newsletter

Transportation Research Board Committee ADC30 September 2015

View from the Chair

Alex Levy, Chair Ecology and Transportation Committee

ON THE ROADS TO RESILIENCE

By Alex Levy, Senior Ecologist, Arcadis, US

Though I do not believe that a plant will spring up where no seed has been, I have great faith in a seed. Convince me that you have a seed there, and I am prepared to expect wonders.

Henry David Thoreau

What you hold in your hands, or are viewing in any of a variety of electronic media, is a timely cross-section of research activities, accomplishments, and practices from the near and far corners of our living world. In the pages that follow are not just ideas from around the world, but a world of ideas from China, South Africa, and North America: and from marine, to temperate, and arid habitats, comes news about the emergence and application of new programmatic policies, research and practices for more-effective and conservation-minded roadside vegetation management, as well as news on terrestrial habitat connectivity, marine ecosystems, and much more. We present these contributions just in time for representatives from around the world gathering at 8th biennial International Conference on Ecology and Transportation (www.icoet.net), where the heralded theme is ***Roads to Resilience: Strengthening Essential Transportation and Ecological Assets across Diverse Landscapes.*** Hosted by the North Carolina Department of Transportation, ICOET 2015 is also the location for the mid-year business meeting of TRB Committee on Ecology and Transportation.

Behind-the-scenes, the Committee on Ecology and Transportation is hard at work—collaborating with other TRB standing committees—to contribute to a robust 95th TRB annual meeting in Washington, DC (January 10-14, 2016). We are the lead cosponsor of Pollinators on the Verge: Policies, Practices, and Implications for Conservation in Roadside Habitats, a half-day workshop that will explore the pros and cons of policies and practices to leverage transportation rights-of-way and greenspace for pollinator management. Along with the joint Subcommittee on Animal Vehicle Collisions, we are sponsoring a lectern session ***Animal-Vehicle Collisions: Understanding and Reducing Risk for Driver Safety and Sustainability***, as well as across section of wildlife and habitat connectivity-themed papers in a lectern session of ***Hot Topics and Emerging Themes in Ecology and Transportation.*** Finally, our committee is collaborating in two lectern sessions sponsored by our sister Committee on Environmental Analysis: ***Achieving Measurable Environmental Benefit as a Direct Result of Alternative Project Delivery*** and ***Best Practices with National Transportation Liaisons.*** Both of these sessions reflect the changing paradigms in the business of efficiently delivering environmental commitments and quality while advancing transportation projects in the United States.

The intersection of these ideas exemplifies our committee's commitment to improve the environmental quality of our transportation systems. We do this by stimulating research in transportation ecology and communicating the results of recent and ongoing research throughout the

ROADS continued on page 2

Transportation Research Board: Standing Committee on Ecology and Transportation (ADC30)

Alex Levy, Chair

http://www.trb.org/ADC30/ADC30.aspx

RESOURCES

USFS Wildlife Crossing Toolkit
http://www.fs.fed.us/wildlifecrossings/

UC Davis Road Ecology Center http://roadecology.ucdavis.edu/

Wildlife and Roads http://wildlifeandroads.org/

FHWA Critter Crossings
http://www.fhwa.dot.gov/environment/critter_crossings/

AASHTO Center for Environmental Excellence
http://environment.transportation.org/

Dan Buford—Ecologist, FHWA Daniel.Buford@dot.gov 202-366-8168

Arizona Wildlife Connectivity:
Statewide Assessment and Use in Planning



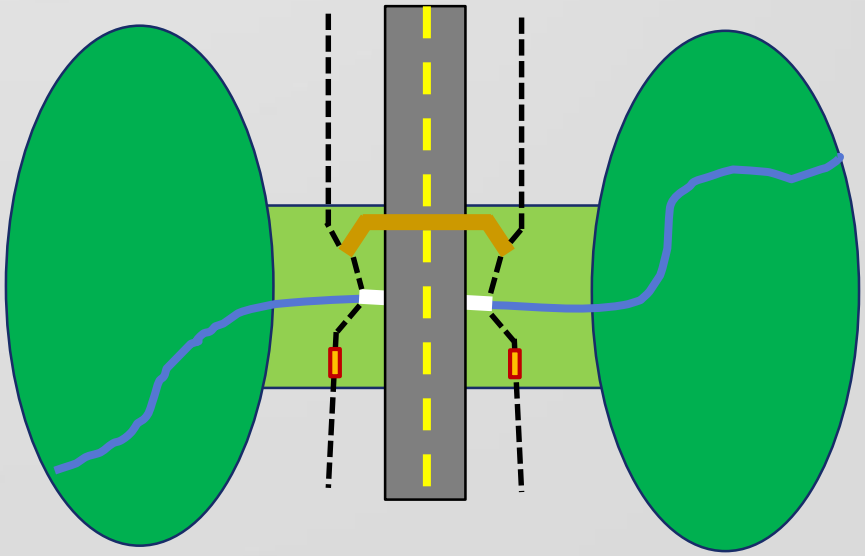
Kris Gade, PhD and Justin White
Biological Resources Program, Environmental Planning
Arizona Department of Transportation
March 30, 2016

Overview

- Connectivity Terms
- Why is Connectivity Important?
- Developing a Statewide Linkage Assessment
- Use in Planning and Environmental Review
- State Route 86 Case Study
- Benefits of Statewide Assessment

Terms

- Linkage
- Passage structures
- Fencing - exclusion or permeable
- Escape measures



Why is Wildlife Connectivity Important?

Safety

(Wildlife-Vehicle Collisions = WVC)

- Human impacts
- Wildlife population impacts
- Economic losses

Landscape Connectivity

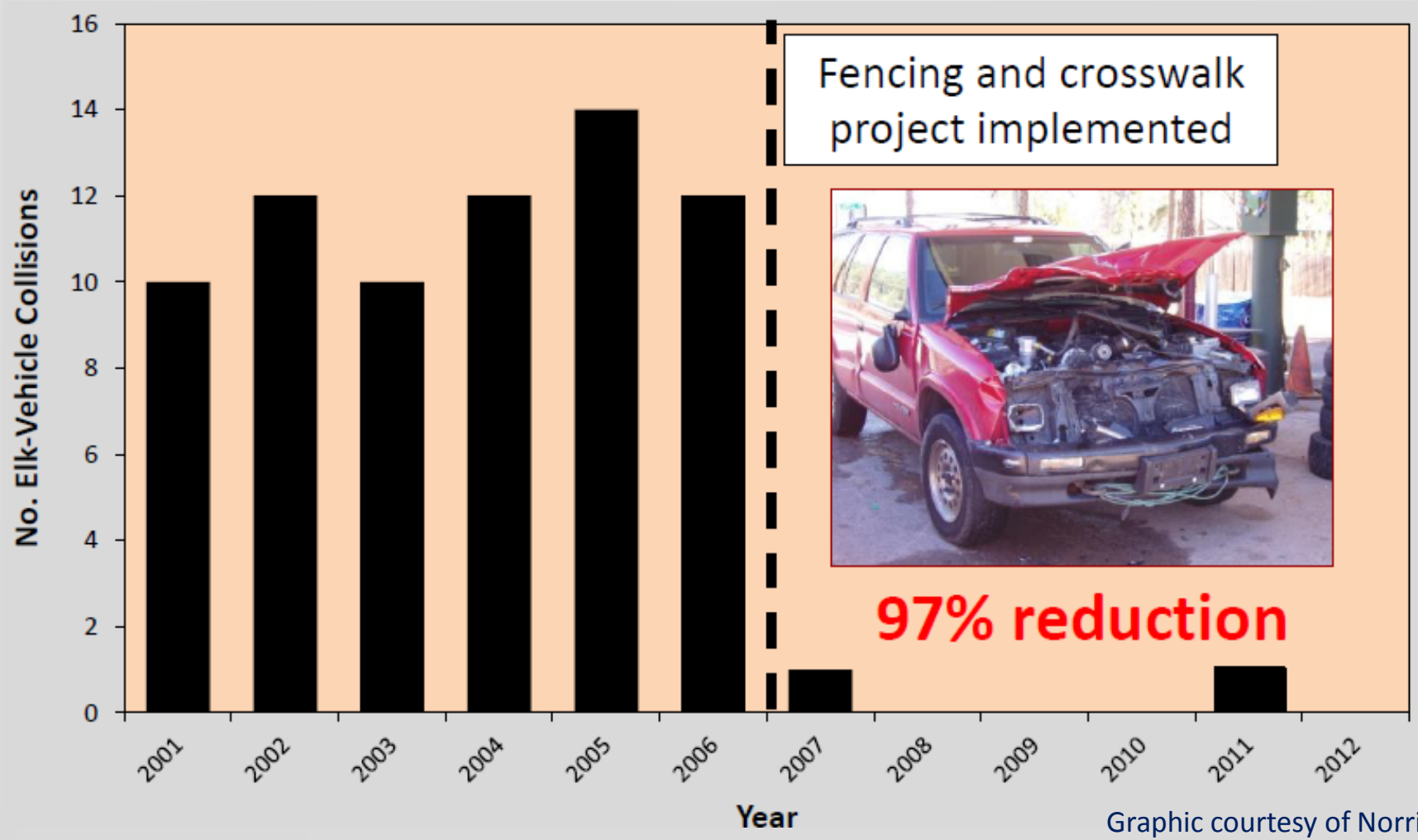
- Population and habitat fragmentation
- Decreased juvenile dispersal and genetic interchange
- Protected and game species

State Route 260 – Elk and Deer Habitat

- 12-mile stretch, high WVC, widened in phases
- Added 11 wildlife underpasses, 6 large bridges
- Long-term monitoring and adaptive management

SR 260 Preacher Canyon Segment (3.1 miles)

Elk-Vehicle Collisions Before and After Fencing



Graphic courtesy of Norris Dodd

SR 260 Preacher Canyon Segment

Elk-Vehicle Collisions Before and After Fencing

Economic benefit from reduced
elk-vehicle collisions on Preacher Canyon Segment:

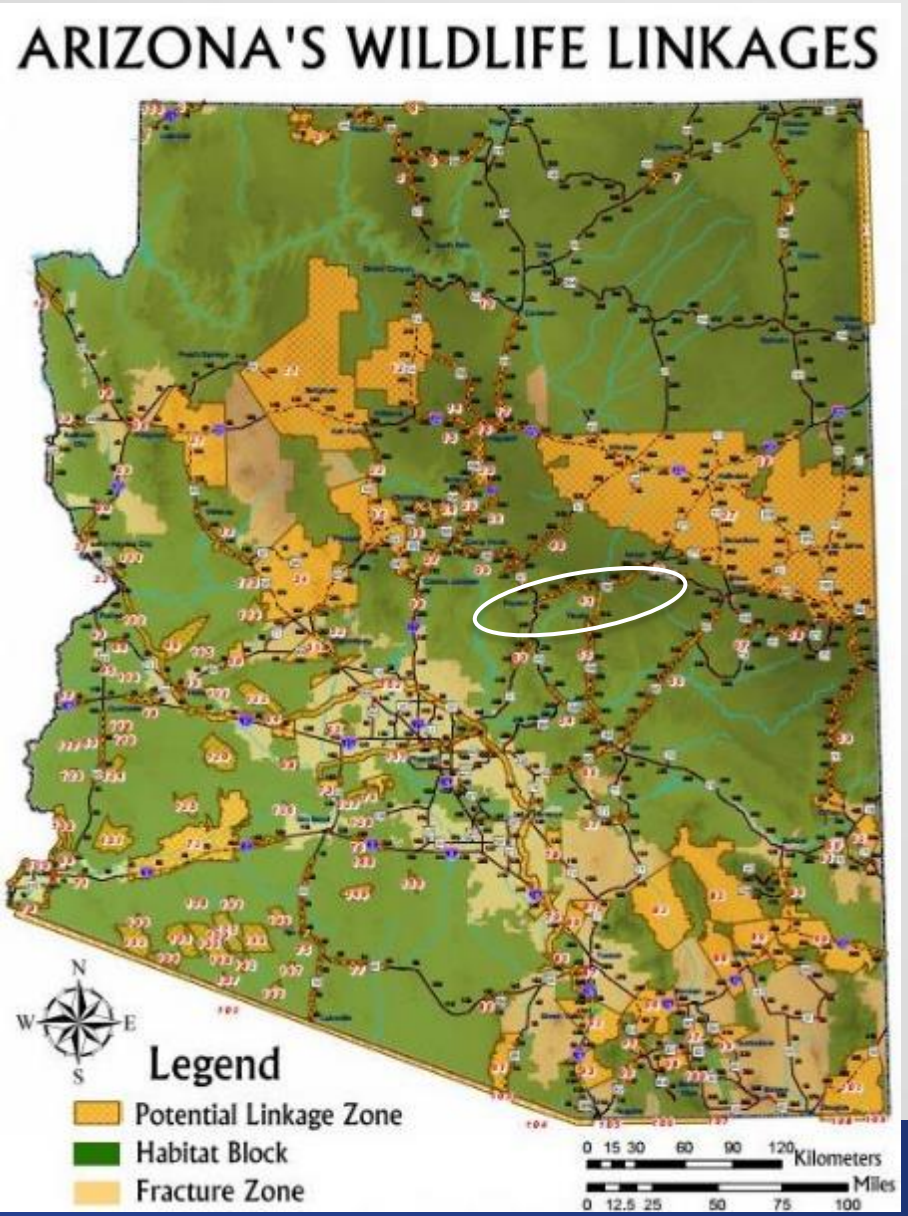
$62,000/mile/year

- Recovered the cost of the entire fencing enhancement project in 4 years

Benefit for the entire SR 260 project (11.8 miles)
for elk- and deer- vehicle collisions:

$87,500/mile/year

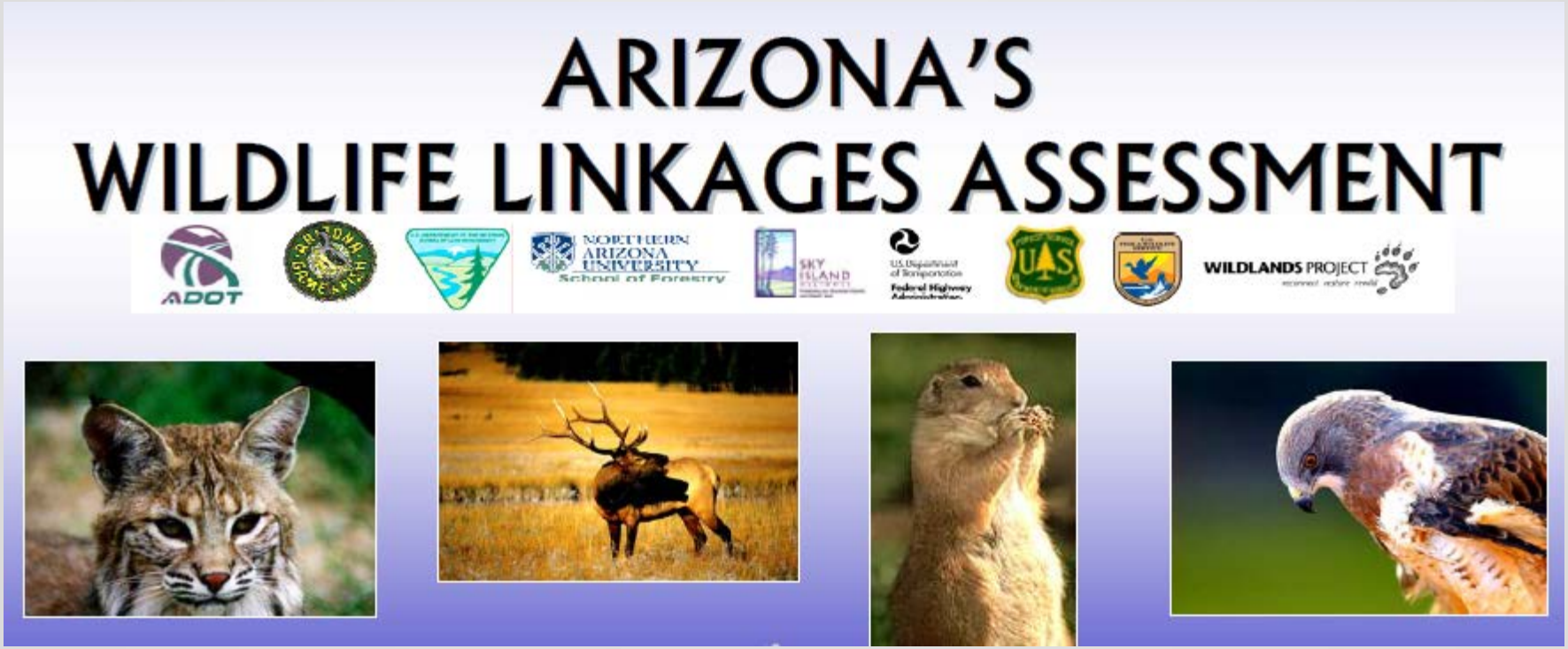
Planning for Statewide Connectivity



Arizona's Wildlife Linkage Workgroup and Assessment (2004-2006)

- Grew from partnership for the SR 260 corridor
- Stakeholders recruited
- Two day workshop led by ADOT, AGFD, FHWA
- Follow up meetings to refine and prioritize linkages
- Final report

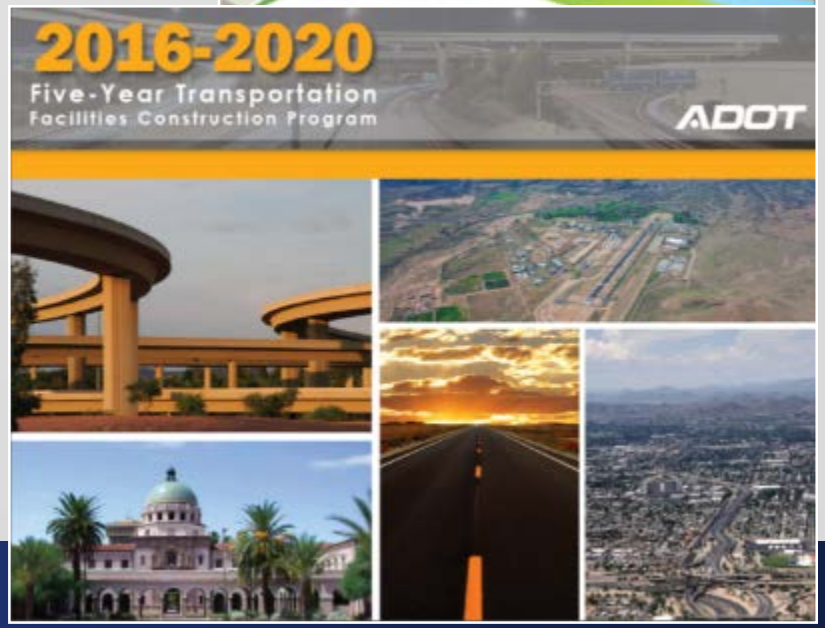
Stakeholder Involvement



- Participation and formal acceptance by federal, state and NGO partners
- Baseline for determining connectivity concerns and highest priority linkage areas

Use in ADOT Project Planning

1. Identify wildlife connectivity opportunities
   - Large-scale corridor assessments
   - Planned construction projects
2. Allows time for data collection
   - Crossing locations
   - Baseline data
3. Prioritization
   - Most effective use of $$
4. Pursue alternate funding



Environmental Review of Projects

ADOT
Environmental Planning

PROJECT DATA SHEET

BIOLOGICAL RESOURCES		
Y	N	[Type "X" to mark boxes]
		ESA Species (list):
		Critical Habitat (list):
		Separate Biology Field Review Recommended?
		Arizona Wildlife Linkage present and potentially affected by scope of project? (if yes, describe in Details below)
		AZ Game and Fish Online Tool Printout Obtained? (Attach 1st page if available)
		Agency Coordination? (Forest/Tribal/BLM – list):
		Species surveys anticipated? (if y
		Potential for herbicide use as pa
		Consultation with USFWS expect

Documentation Type	BESF		BE, no speci analyses

Deliverable(s) and due date(s):

Details: (Include timing and duration of surveys, ex affected.)

Comments:

During early project review, we check:

- Is the project in a linkage?
- Could the scope of work affect connectivity?

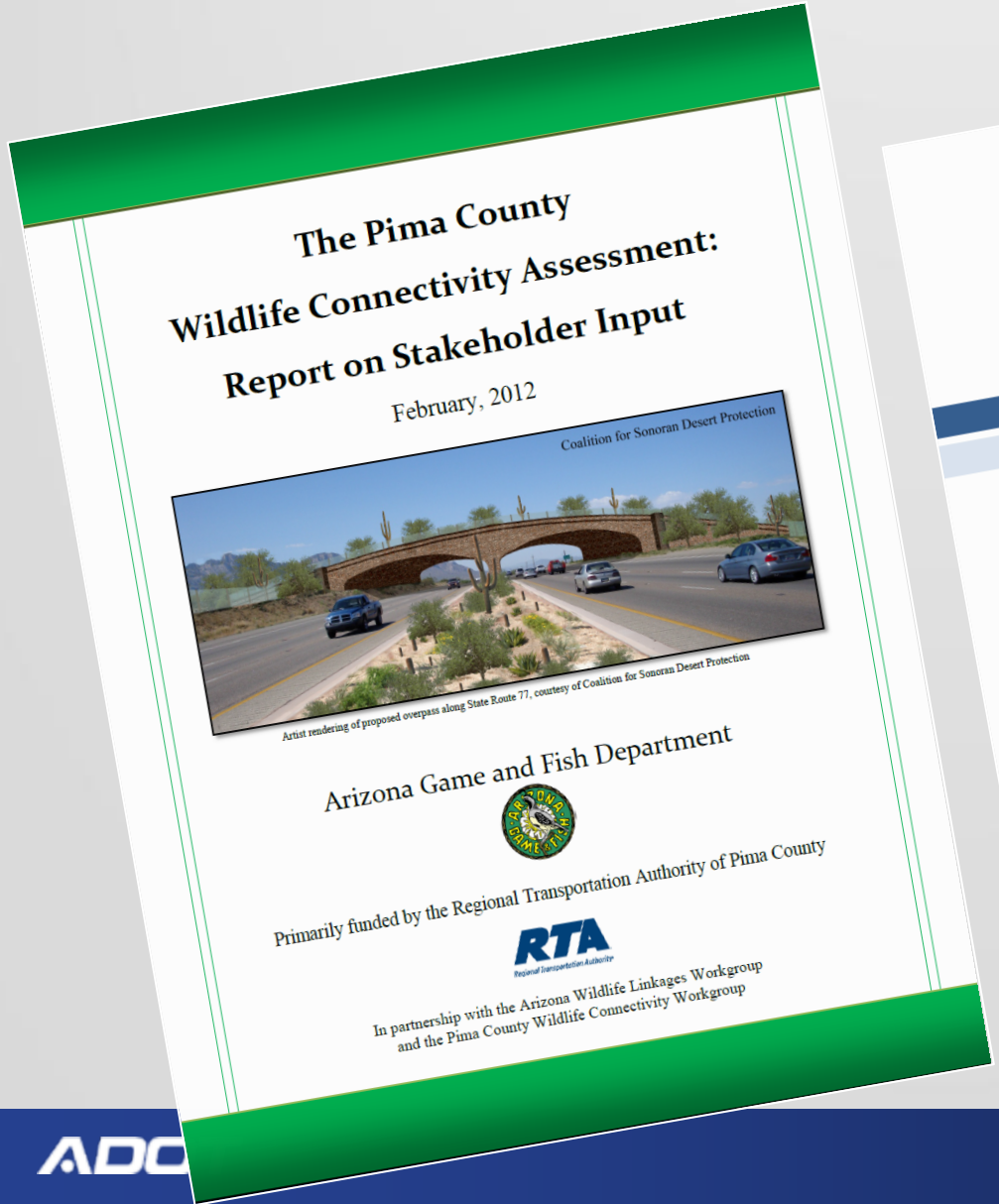
➢ Consider mitigation of impacts and opportunities for retrofit of fences, removal of riprap, etc.

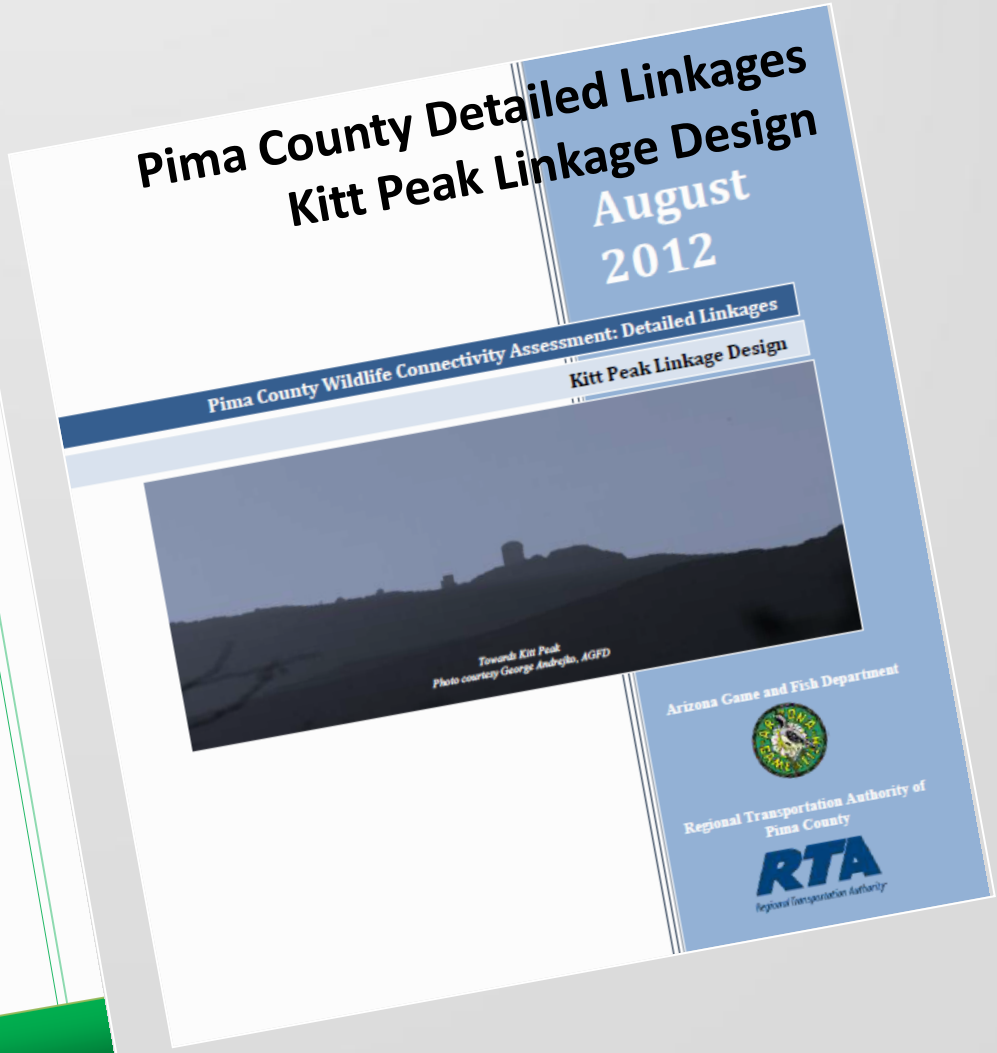
➢ Allows time for minor modifications to scope and plan for analysis in the biology document

Additional Data Sources

- Monitoring of existing structures
- Wildlife-vehicle collision patterns
- GPS data for tracking movement, crossing attempts and successes
- Traffic relationships from Automatic Traffic Recorder traffic counts
- Regional and detailed studies

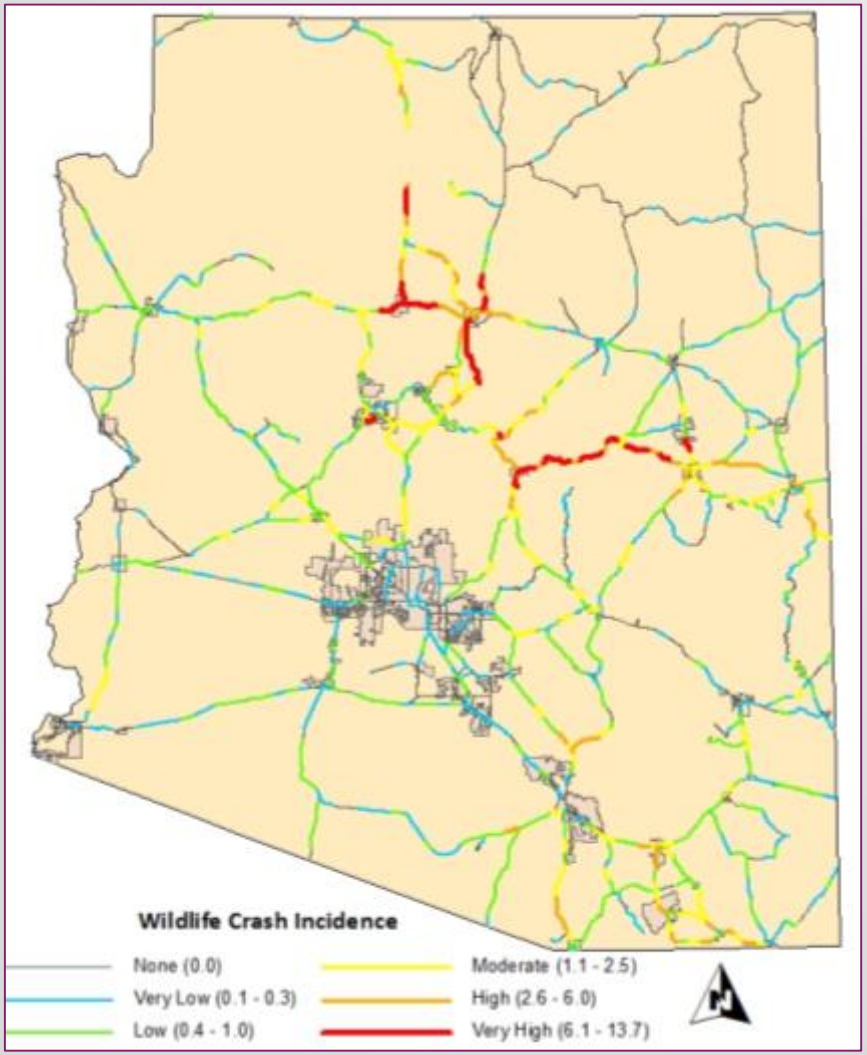
Regional and Detailed Studies



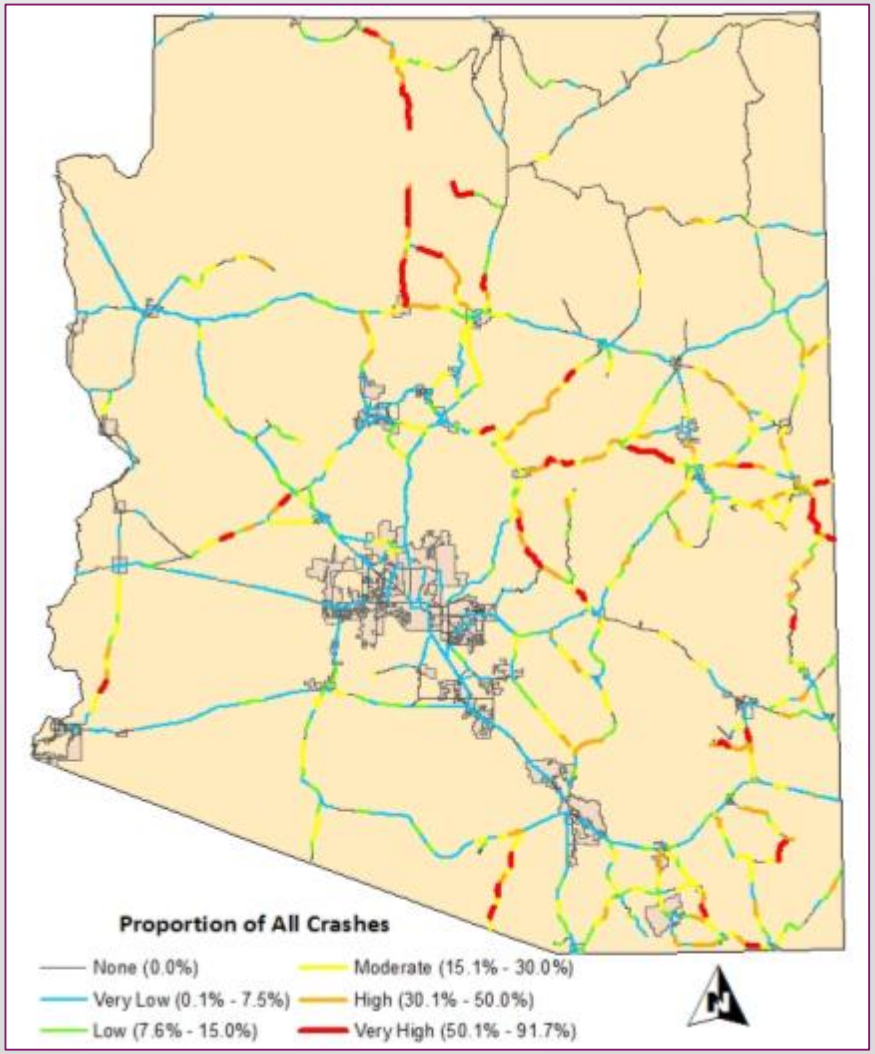


Wildlife-Vehicle Crash Data (2004-2013)

Wildlife-Vehicle Crash Incidence

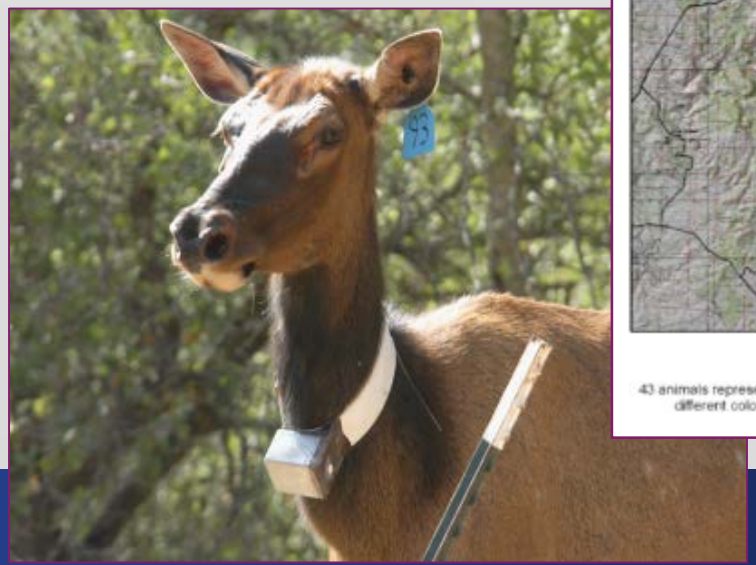


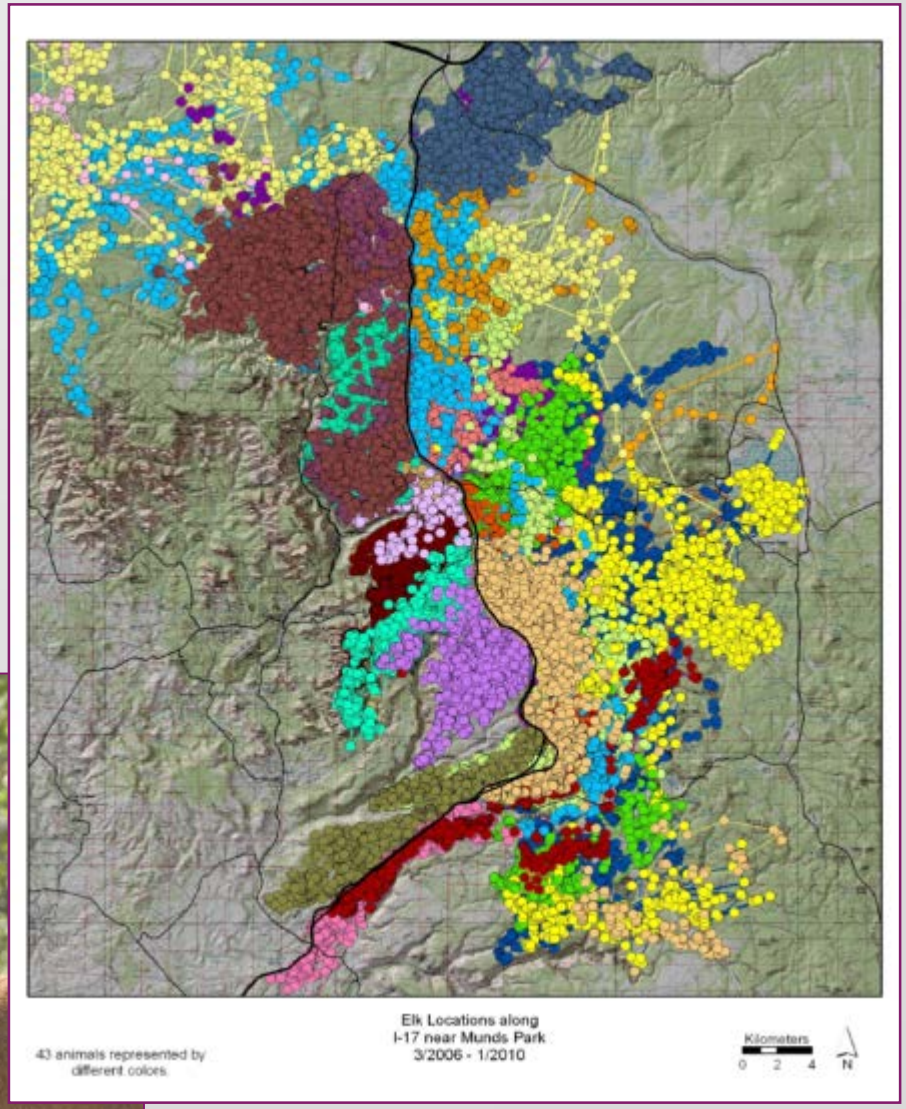
Wildlife Crashes as a Proportion of All Crashes



GPS Data - Ungulates

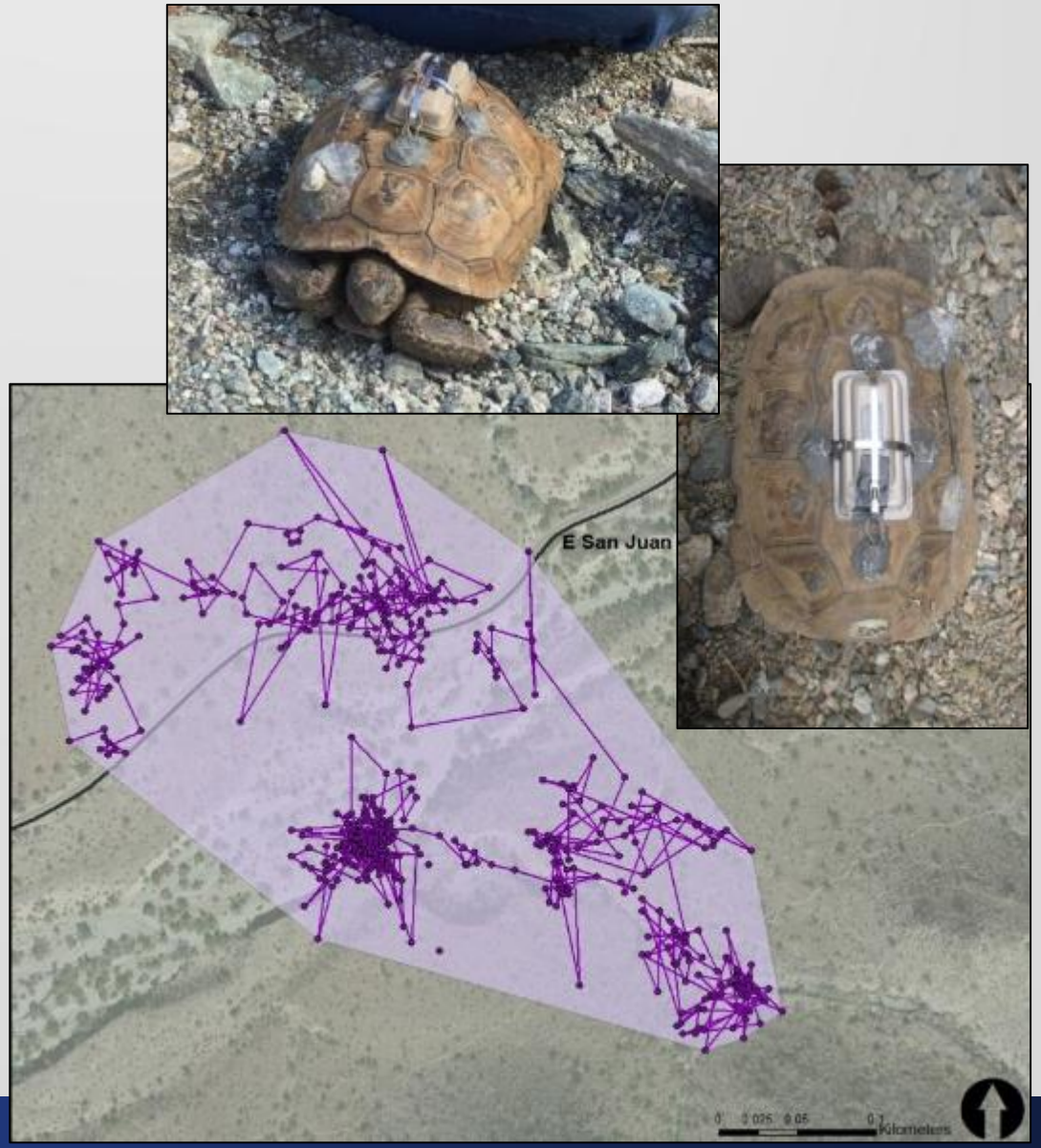
- Arizona Game and Fish studies of ungulates (deer, elk, sheep)
- Capture animals to put on collars
- GPS collars record animal location every 2 hours for 18-30 months
- Retrieve collars after they drop off





GPS Data – Desert Tortoises

- Arizona Game and Fish tortoise studies
- Capture animals to cement on VHF and GPS transmitters
- Battery allows GPS to record locations for ~30 days
- VHF transmitter used to locate tortoise as needed
- Replace GPS monthly during active season



Kitt Peak Linkage Case Study

Proactive Endangered Species Management using:

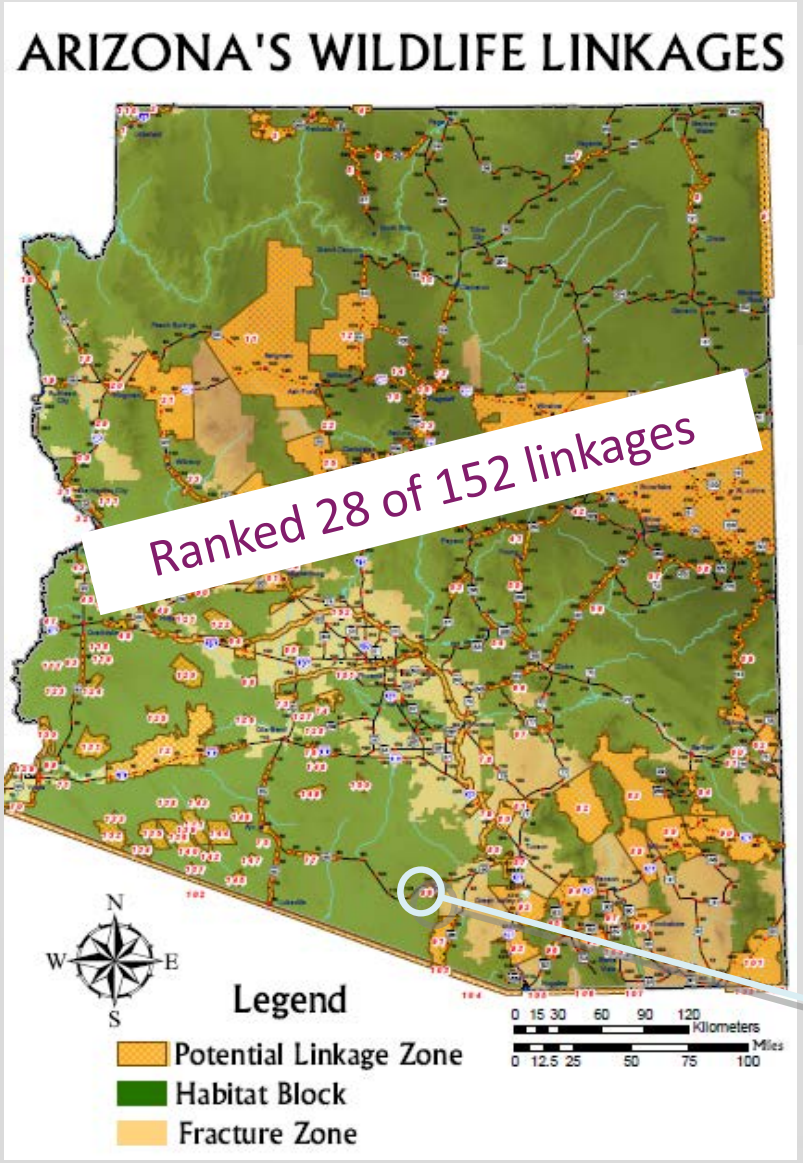
- **Cooperation**
- **Science-based Connectivity Strategy**
- **Dedicated Funding**

ADOT

GREAT SEAL OF THE TOHONO O'ODHAM NATION

RTA
Regional Transportation Authority

Kitt Peak Linkage



Linkage 86
Kitt Peak

Sky Island Ecoregion
Sonoran Desert Ecoregion

County: Pima

ADOT Engineering District: Tucson
ADOT Maintenance: Three Points
ADOT Natural Resources Management Section: Tucson

Council of Government: Pima Association of Governments

FHWA Engineering: A2

Legislative District: 25

Biotic Communities (Vegetation Types):

AZ Upland Sonoran Desertscrub	9%
Madrean Evergreen Woodland	28%
Semidesert Grassland	63%

Land Ownership:

Private Land	1%
Tribal Land (Tohono O'dham)	99%

Identified Species:

- Cactus Ferruginous Pygmy-owl *Glaucidium brasilianum cactorum*
- Giant Spotted Whiptail *Aspidoscelis burti stictogrammus*
- Maricopa Leaf-nosed Snake *Phyllorhynchus browni lucidus*
- Mule Deer *Odocoileus hemionus*
- Sonoran Desert Tortoise *Gopherus agassizii*

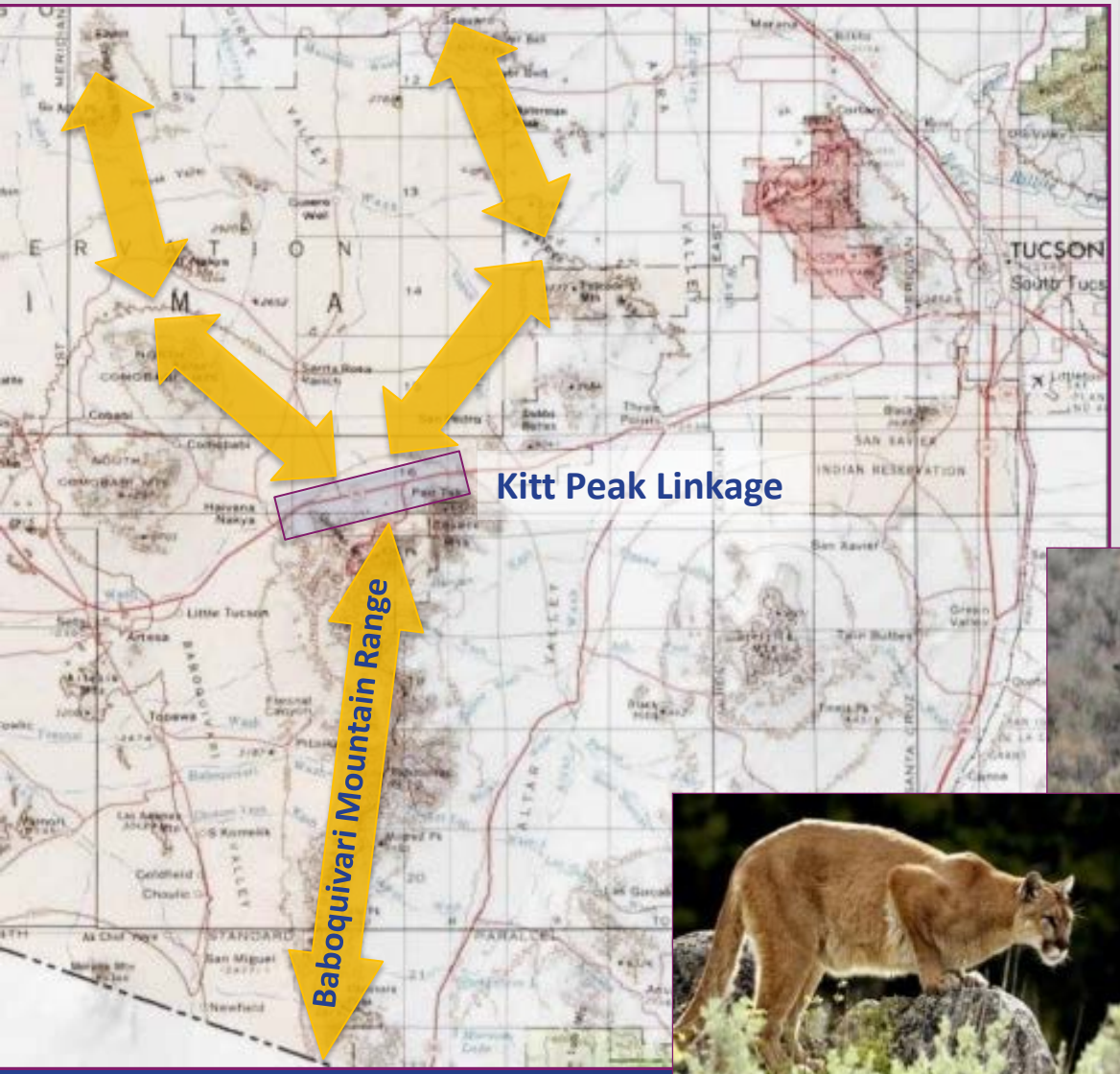
Threats:

- Border Security
- Highway (SR 86; SR 386)
- Urbanization

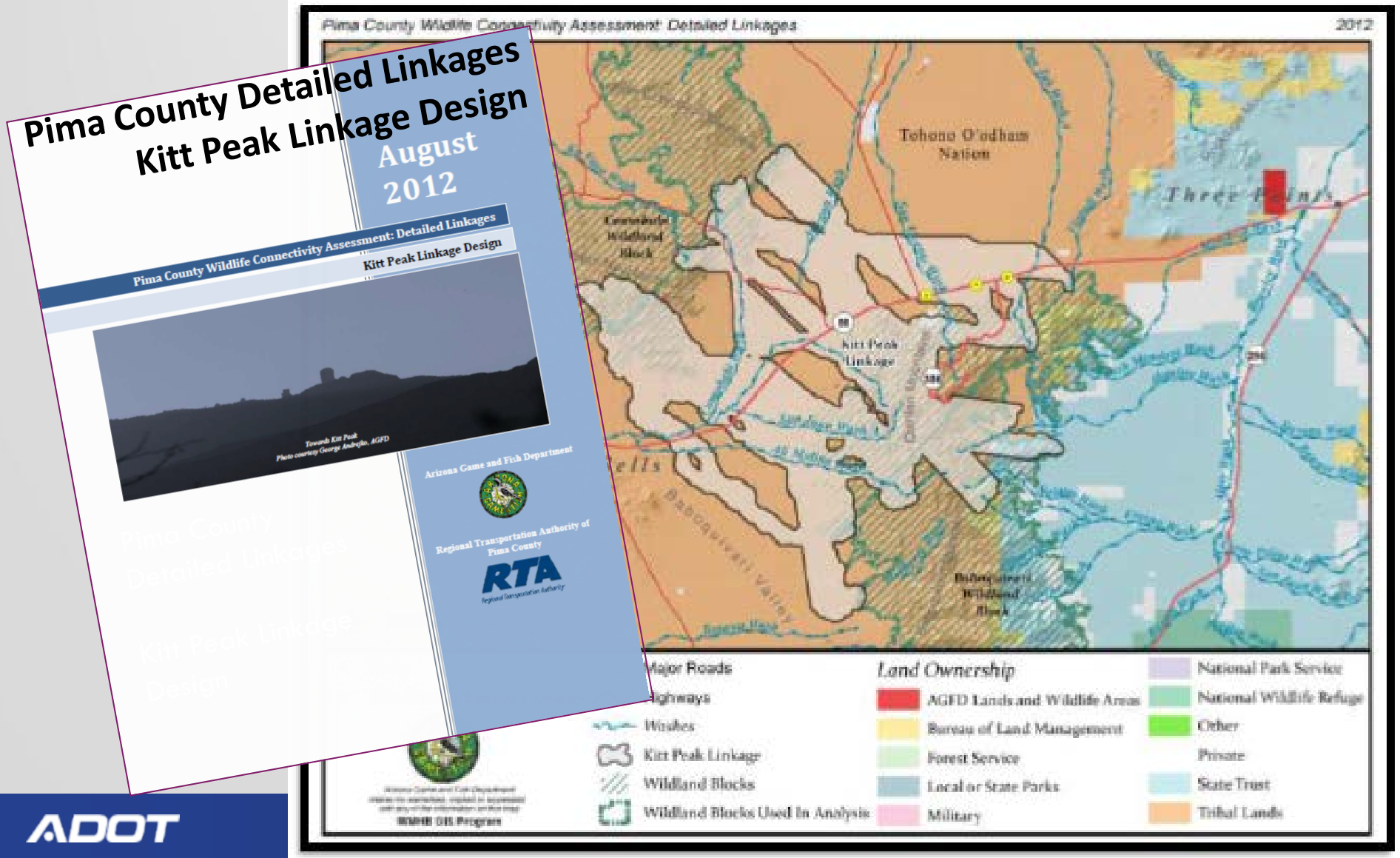
Kitt Peak Linkage

Connectivity for highly mobile wildlife species

- Desert bighorn sheep
- Mule deer
- Mountain lion

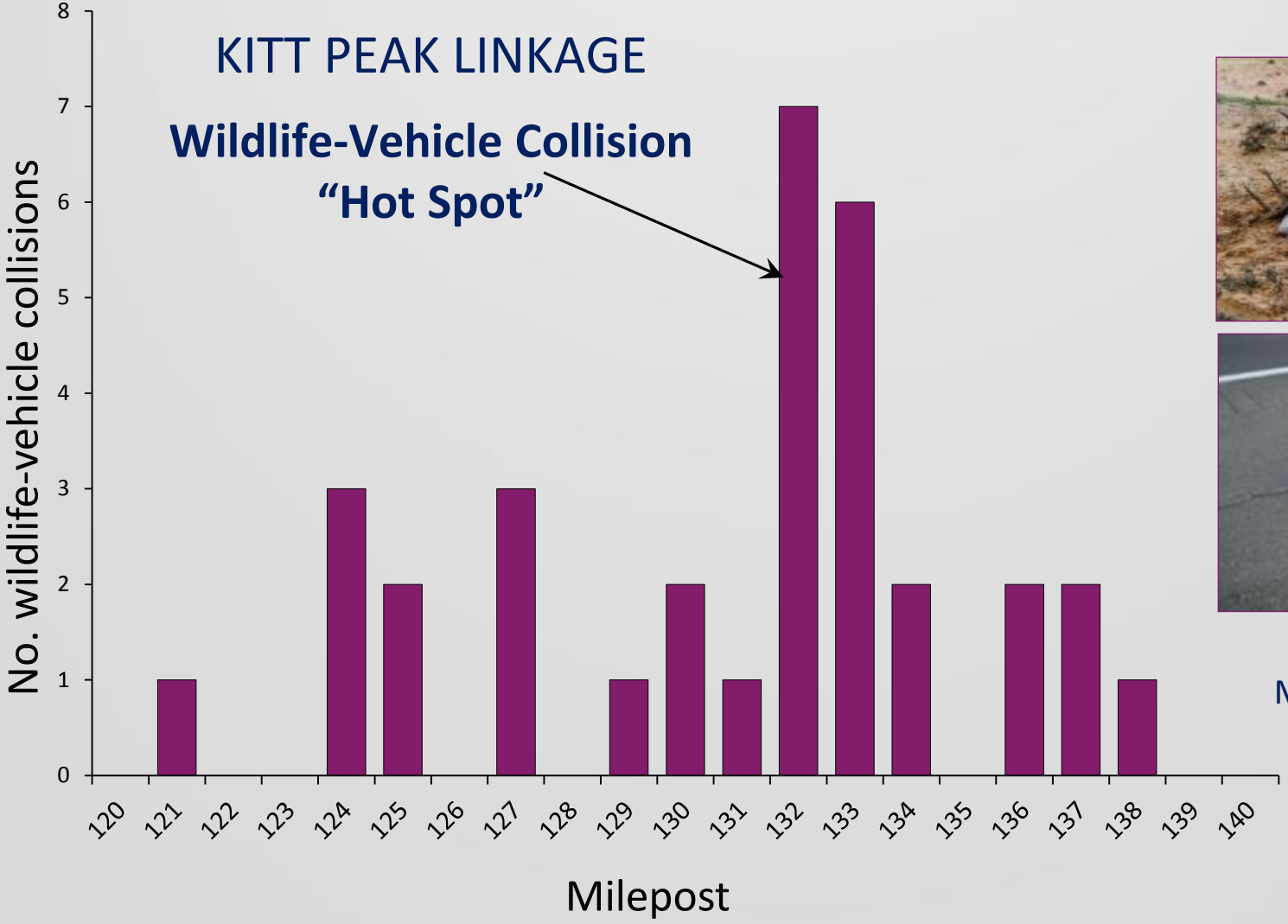


Kitt Peak Linkage Corridor Design Model



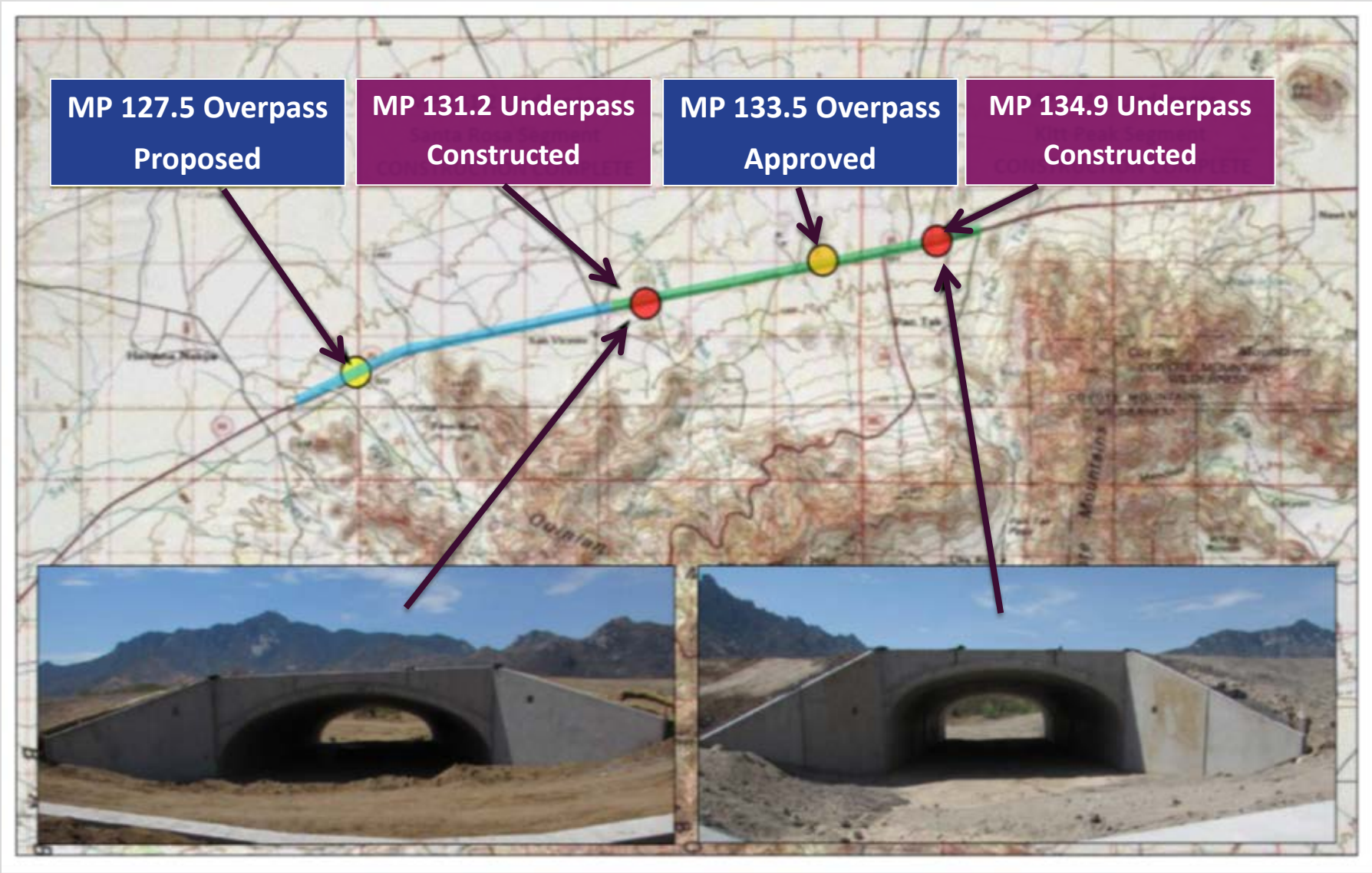
ADOT

State Route 86 Wildlife-Vehicle Collisions



SR 86
Milepost 120-140
2000-2013
Source: ADOT

Kitt Peak Linkage Connectivity Strategy



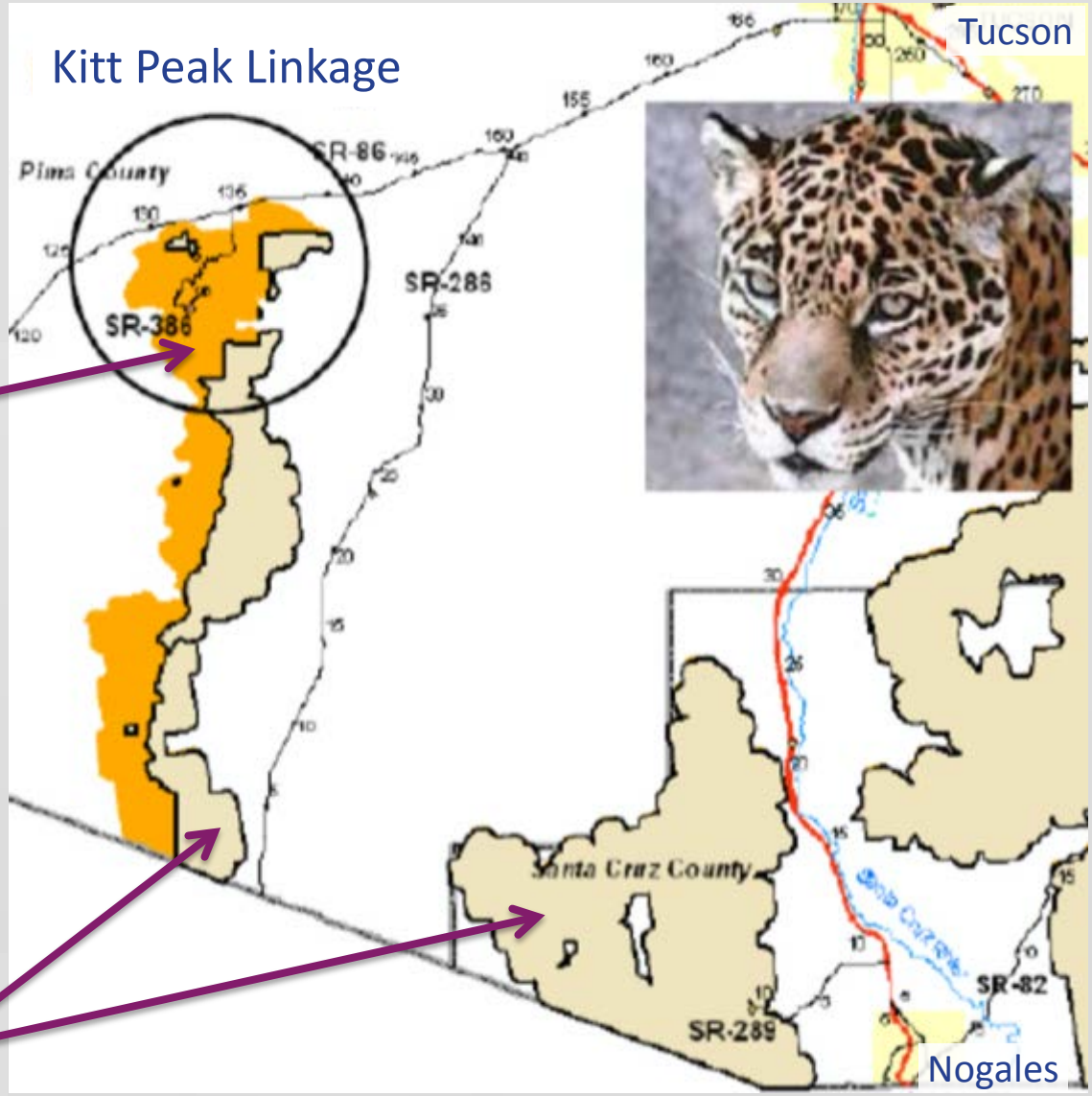
Funded by RTA; $45M over 20 years for projects in Pima County

Kitt Peak Linkage – 1st Photo

Kitt Peak Linkage Case Study

Proposed
but not designated
as jaguar
Critical Habitat
(gold)

Designated jaguar
Critical Habitat (tan)



Kitt Peak Linkage Case Study

The Kitt Peak Linkage area was excluded from the final Critical Habitat for the jaguar due to proactive planning

- Wildlife management by the Tohono O'odham Nation
- Comprehensive regional conservation planning in Pima County
- Wildlife connectivity funding through the *Regional Transportation Authority (RTA)*
- Partnering with ADOT/FHWA on wildlife elements in widening projects

Benefits of Statewide Assessment

- Systematic approach to safety
- Wildlife stewardship
- Avoid species listings
- Identify and plan for opportunities
  - Partnerships
  - Alternate funding sources
- Prioritization
  - Direct funds to most effective use
  - Agreement that some areas are lower priority

Acknowledgements

The reports, studies, photos and maps in this presentation were generated as a result of work and support of many ADOT and AGFD employees, including:

- Norris Dodd
- Jeff Gagnon
- Daniel Leavitt
- Ray Schweinsburg
- Scott Sprague
- Justin White
- Todd Williams

Arizona Wildlife Connectivity Resources

Linkage Reports

Arizona Wildlife Linkages Statewide Assessment
http://azdot.gov/business/environmental-planning/programs/wildlife-linkages

Arizona Game and Fish Department Linkage Reports
http://www.azgfd.gov/w_c/conn_whatGFDoing.shtml

Pima County detailed linkage studies
http://www.azgfd.gov/w_c/conn_Pima.shtml

Guidance

ADOT Wildlife Connectivity Guidance (engineering details)
http://azdot.gov/business/environmental-planning/environmental-guidance/technical-guidance

AZGFD Wildlife-friendly Guidelines (by project and species)
http://www.azgfd.gov/hgis/guidelines.aspx

Questions:

Justin White
Biology Program Manager
jwhite@azdot.gov , 602-399-3233

Kris Gade
Roadside Resources Specialist
kgade@azdot.gov, 602-292-0301

COLORADO
Department of Transportation

Eco-logical Community of Practice Webinar: Wildlife and Transportation

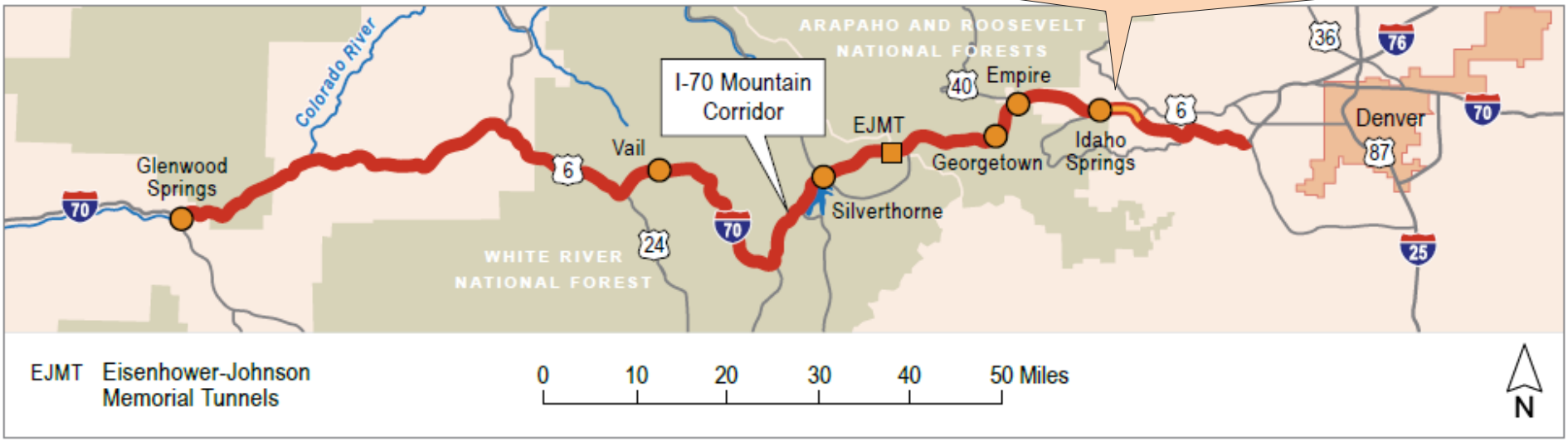
Implementing Eco-logical through Strong Partnerships, Processes and Data

March 30, 2016

Agenda

1. Context & Corridor Challenges
2. Consensus Agreement & Preferred Alternative
3. Adaptive Management and Context Sensitive Solutions
4. Corridor Specific Wildlife toolkit
5. Implementation: Twin Tunnels Widening
6. Updating the vision and Lesson Learned

I-70 Mountain Corridor



Narrow Canyons, Rock Cuts, and Tunnels

Weather and Traffic Challenges

Sensitive Environment

The I-70 Mountain Corridor Challenge: Consensus Agreement & NEPA

- Studied for more than twenty years
- Collaborative Effort's Consensus Recommendation (2008)
- Tier 1: Programmatic Environmental Impact Statement & Record of Decision (2011)

I-70 Mountain Corridor Vision

I-70 Programmatic Environmental Impact Statement's (PEIS) Preferred Alternative includes three components:

- A multimodal solution
- Highway (Infrastructure) Improvements
- Operational Improvements

Adaptive Management

- This corridor will be improved incrementally over the next generation
- Minimum program vs Maximum program
- Interim and ultimate improvements
- Periodic check-ins

Context Sensitive Solution Approach

- 6 step process for decision making
- Tools to navigate through the steps, including:
  - Design criteria
  - Aesthetic guidelines
  - Areas of Special Attention
- Multi-agency agreements related to wildlife mobility, historic resources and districts, water quality and overall creek health

CSS Process: Core Values

- Safety
- Mobility
- Aesthetics
- Wildlife
- Creek Health
- History
- Constructability
- Decision Making
- Community Values

Wildlife Mobility Toolkit

A Landscape Level Inventory of Valued Ecosystem (ALIVE):

- Stakeholder committee including CDOT, FHWA, USFS, USFWS, BLM, Colorado Parks & Wildlife
- Establish a program of cooperation to improve permeability for future highway projects
- Memorandum of Understanding (2008)

Wildlife Mobility Toolkit

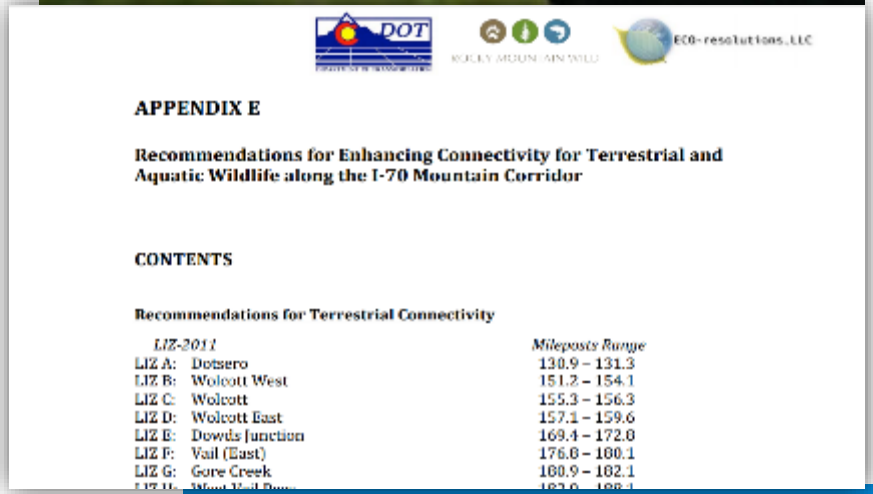
Eco-logical Framework- Gathered Corridor-wide from:

- Roadway Inventory
- Agencies
- Field survey
- Camera Monitoring
- Animal Vehicle Collisions
- Public Input/observation

Wildlife Mobility Toolkit

Eco-logical Framework:

- Linkage Interference Zones (LIZ): 17 segments spanning 65 miles
- Site Specific recommendations
- Early enhancement Opportunities
- BMPs for Permeability



APPENDIX E

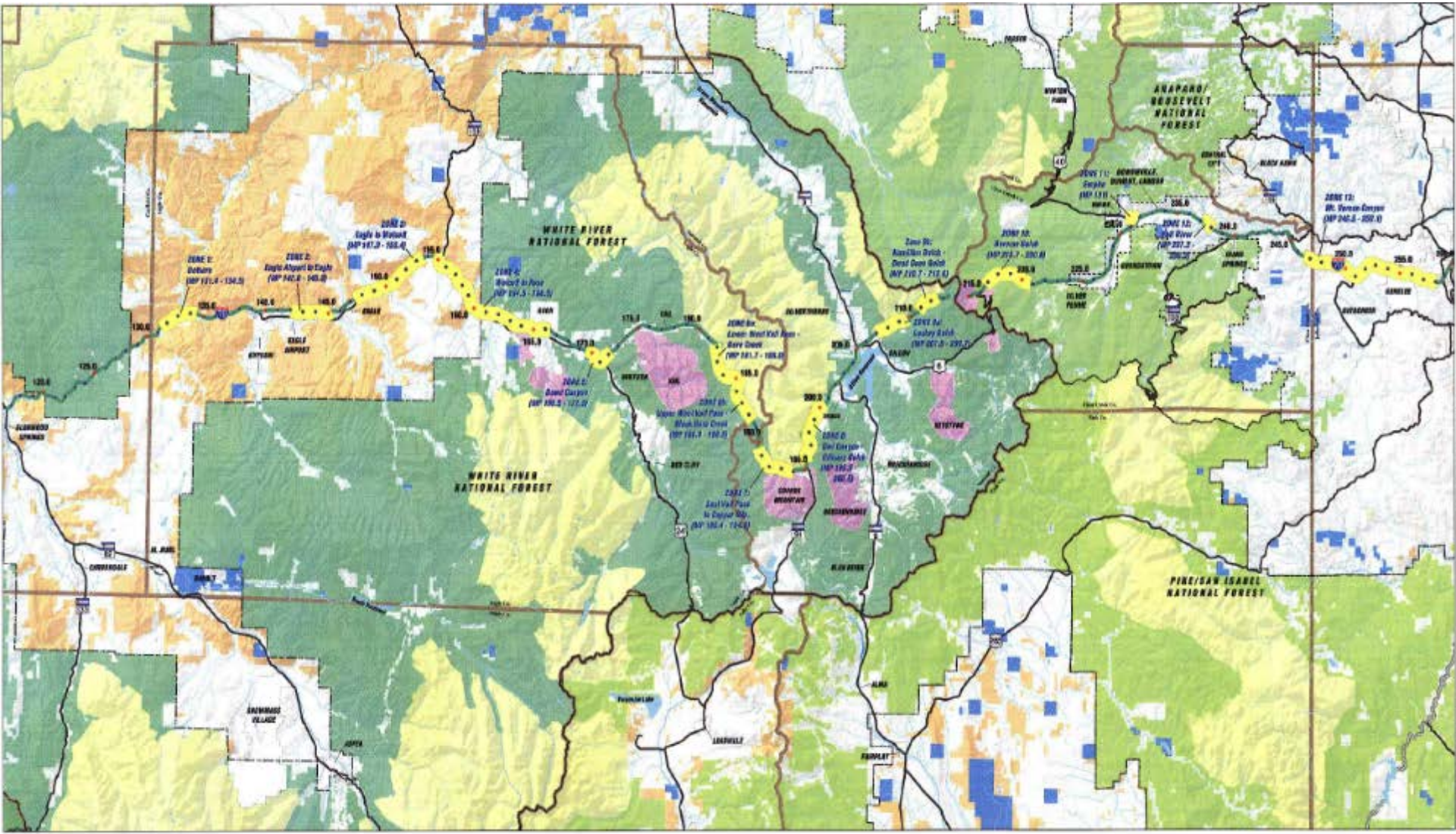
Recommendations for Enhancing Connectivity for Terrestrial and Aquatic Wildlife along the I-70 Mountain Corridor

CONTENTS

Recommendations for Terrestrial Connectivity

LIZ-2011		*Mileposts Range*
LIZ A:	Dotsero	130.9 – 131.3
LIZ B:	Wolcott West	151.2 – 154.1
LIZ C:	Wolcott	155.3 – 156.3
LIZ D:	Wolcott East	157.1 – 159.6
LIZ E:	Dowds Junction	169.4 – 172.0
LIZ F:	Vail (East)	176.0 – 180.1
LIZ G:	Gore Creek	180.9 – 182.1

Linkage Interference Zones (LIZ)

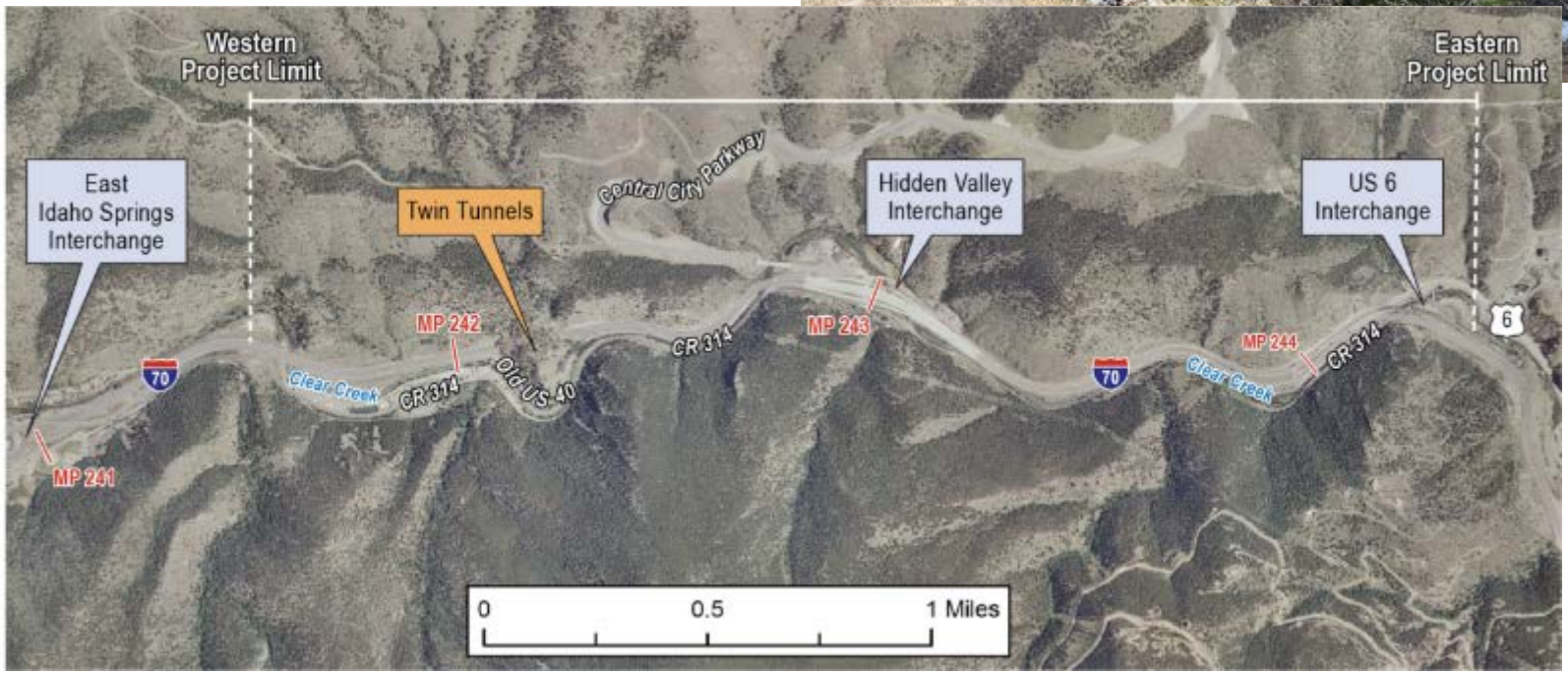


Implementation:
Twin Tunnels Widening

Twin Tunnels Widening

Purpose: Improve eastbound highway safety, operations and travel time reliability in the Twin Tunnels area of the I-70 Mountain Corridor at the east end of Idaho Springs.

Twin Tunnels Widening



Twin Tunnels Widening

Context Sensitive Solutions (CSS) Process:

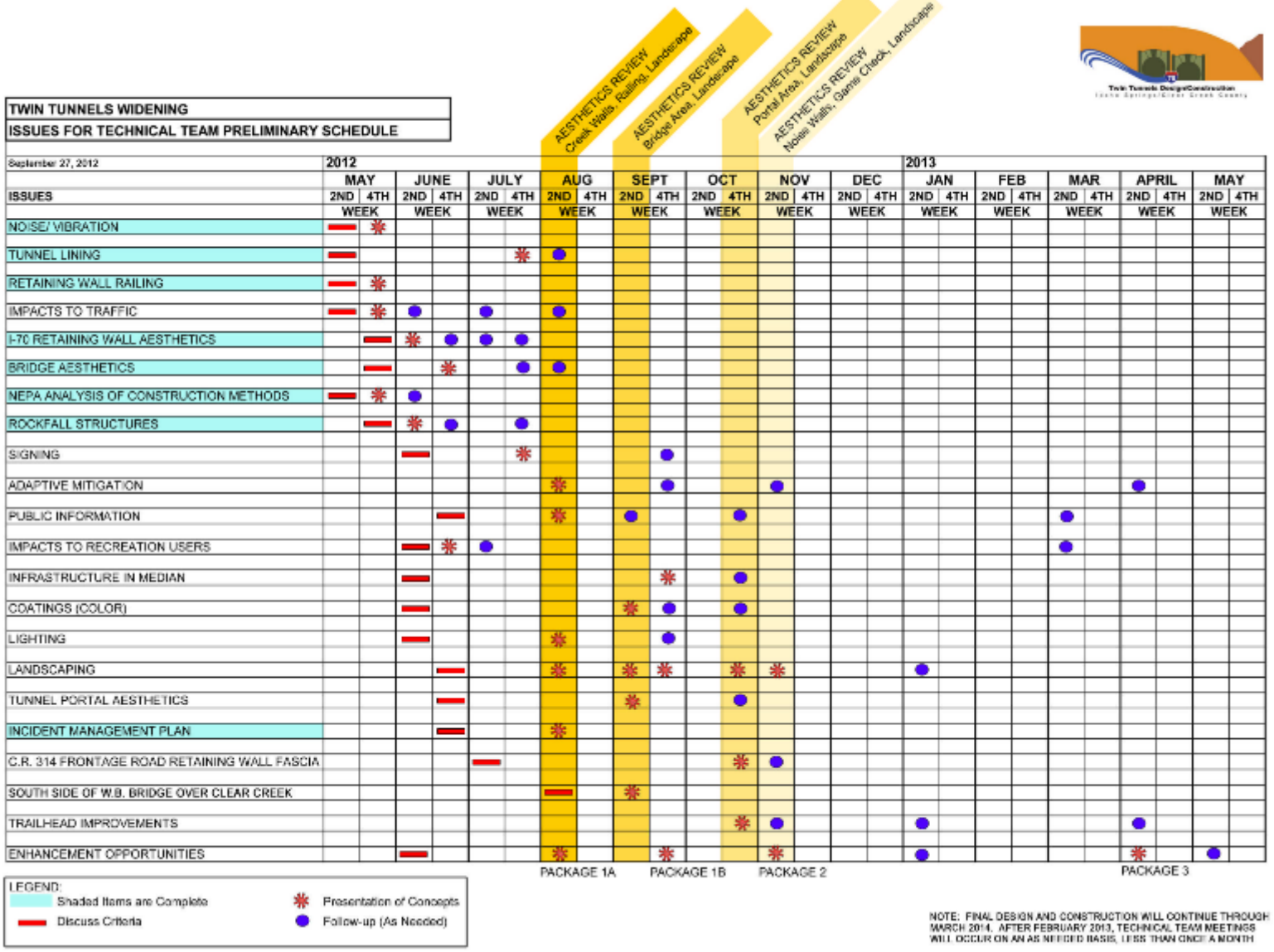
- Endorse of tools and process
- Identify recommendations from previous REF
- Balance all core values

Twin Tunnels Widening

Decision Making:

- Multi-disciplinary teams
- Involving a full range of stakeholders
- Understanding the landscape, community, and valued resources
- Reaching consensus on approaches and alternatives
- Open, honest, and continuous communication
- No backtracking

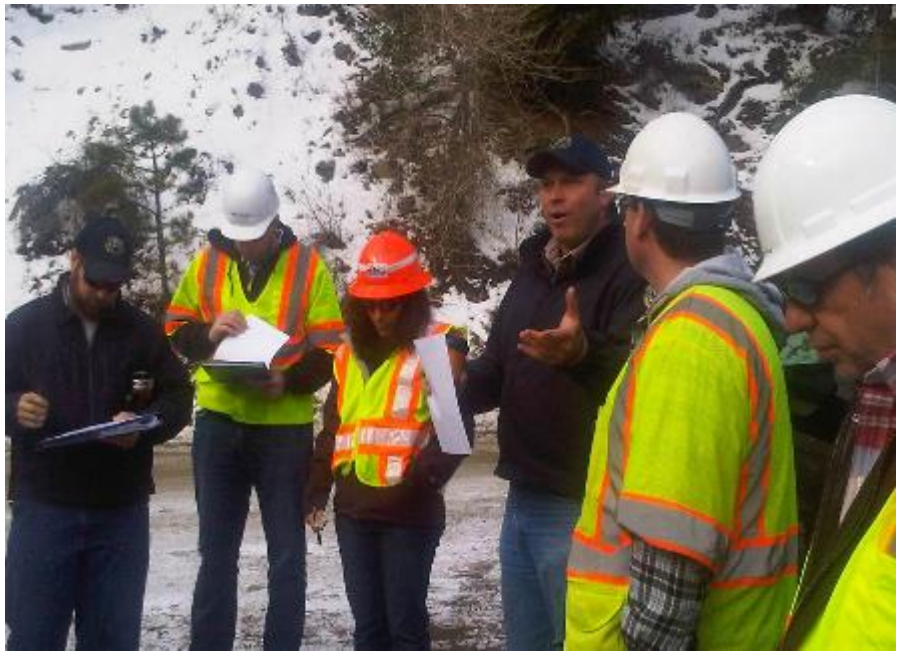
CSS Process: Issues Tracking



Implementation: Twin Tunnels Widening

Fair **Better** **Best** Rating System

1. Proposed by Project Team
2. Augmented by the Technical Team
3. Utilized by the Project Team to develop solutions
4. Results presented to Technical Team
5. Technical Team offers feedback
6. As necessary, Project Team incorporates refinements



Implementation: Twin Tunnels Widening

- Project Benefits:
  - Improved mobility
  - Improved safety
  - Accelerated delivery
  - Improved water quality & aquatic habitat
  - New trailhead & greenway facilities
  - Improved aesthetics

Implementation: Twin Tunnels Widening

Permeability Solutions:

- Widened bridge with bench for wildlife
- Cut and approach along retaining wall
- Culvert approach
- Wildlife friendly fencing

Implementation:
Twin Tunnels Widening

Adaptive Management (Revisited)

- Document Project successes and lessons learned
- Update CSS website
- Periodic check-ins
- 10 year reassessment of assumptions, vision, needs

Eco-logical Framework Successes

- Commitment to setting up the rules and not wavering from the process
- Stakeholders and CDOT knew the rules
  - How the CSS process is used to aid in making decisions
  - Understanding of what CSS is not; an authority for making decisions
  - Commitment to continue moving forward without “Back Tracking”

Eco-logical Framework Successes

- Significant stakeholder involvement and resource/staff commitment from multiple agencies and industry
- Find ambassadors for the process and projects
- Demonstrate connections between Ecological and familiar transportation terms.

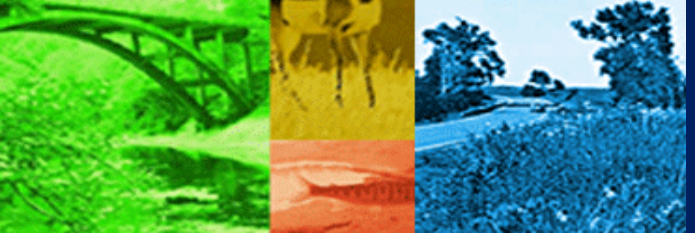
Eco-logical Framework Successes

- Upfront investment to establish tools allows projects to move quickly through NEPA, final design, construction. Four years of successful implementation has fostered trust between Stakeholders and CDOT
- Adaptive management and continuous improvement focus of PEIS and CSS process

Thank you

- ALIVE MOU: https://www.codot.gov/projects/contextsensitivesolutions/docs/plans/alivemou.pdf
- I-70 Context Sensitive Solutions: www.codot.gov/projects/contextsensitivesolutions
- I-70 Eco-logical Framework: https://www.codot.gov/projects/contextsensitivesolutions/docs/pdfs/i-70-eco-logical-project-final-report-sept2011.pdf
- Twin Tunnels Project: https://www.codot.gov/projects/i70twintunnels

david.singer@state.co.us 303-757-9878



Questions?

Wildlife and Transportation

Contact information:

Kate Kurgan, kkurgan@aashto.org

David Williams, david.Williams@dot.gov

Daniel Buford, daniel.Buford@dot.gov

Kris Gade, kgade@azdot.gov

Justin White, jwhite@azdot.gov

David Singer, david.singer@state.co.us