Wildlife and Transportation

Presenters:

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March 30, 2016

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

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 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
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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)
SAFETY
COST
GOOD STEWARDS
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
Transportation Research Board:
Standing Committee on Ecology
and Transportation (ADC30)

Alex Levy, Chair

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

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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

Fencing and crosswalk project implemented

97% reduction

Graphic courtesy of Norris Dodd

ADOT Research Center Report 603, December 2012
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


- 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
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

The Pima County
Wildlife Connectivity Assessment:
Report on Stakeholder Input
February, 2012

Arizona Game and Fish Department

Primarily funded by the Regional Transportation Authority of Pima County

In partnership with the Arizona Wildlife Linkages Workgroup
and the Pima County Wildlife Connectivity Workgroup

Pima County Detailed Linkages
Kitt Peak Linkage Design
August 2012
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
Kitt Peak Linkage

ARIZONA'S WILDLIFE LINKAGES

Legend
- Potential Linkage Zone
- Habitat Block
- Fracture Zone

Ranked 28 of 152 linkages

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 Desertsrub 9%
- Madrean Evergreen Woodland 28%
- Semidesert Grassland 63%

Land Ownership:
- Private Land 1%
- Tribal Land (Tohono O'odham) 99%

Identified Species:
- Cactus Ferruginous Pygmy-owl Glaucidium brasilianum caecorum
- 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

Pima County Detailed Linkages
Kitt Peak Linkage Design
August 2012
State Route 86 Wildlife-Vehicle Collisions

KITT PEAK LINKAGE

Wildlife-Vehicle Collision
“Hot Spot”

No. 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

- MP 127.5 Overpass: Proposed
- MP 131.2 Underpass: Constructed
- MP 133.5 Overpass: Approved
- MP 134.9 Underpass: Constructed
Kitt Peak Linkage – 1st Photo
Kitt Peak Linkage Case Study

Kitt Peak Linkage

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

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

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

**Guidance**

ADOT Wildlife Connectivity Guidance (engineering details)

AZGFD Wildlife-friendly Guidelines (by project and species)

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Eco-logical Community of Practice Webinar: Wildlife and Transportation
Implementing Eco-logical through Strong Partnerships, Processes and Data
March 30, 2016
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

Twin Tunnels Improvements
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 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
Eco-logical Framework:
• Linkage Interference Zones (LIZ): 17 segments spanning 65 miles
• Site Specific recommendations
• Early enhancement Opportunities
• BMPs for Permeability
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
Context Sensitive Solutions (CSS) Process:

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

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| Presentation of Concepts            |          |           |           |          |           |          |          |          |          |          |          |           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Discuss Criteria                    |          |           |           |          |           |          |          |          |          |          |          |           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Follow-up (As Needed)               |          |           |           |          |           |          |          |          |          |          |          |           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |

**Notes:** Final design and construction will continue through March 2014. After February 2013, technical team meetings will occur on an as-needed basis, less than once a month.
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
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
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

- I-70 Context Sensitive Solutions: www.codot.gov/projects/contextsensitivesolutions
- Twin Tunnels Project: https://www.codot.gov/projects/i70twintunnels
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Questions?
Wildlife and Transportation

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