Arizona Department of Transportation
Guidelines for Highways on Bureau of Land Management and U.S. Forest Service Lands 2008

Chapter Overview Presentations

Twelve Chapter Overview presentations supplement the Guidelines document. Chapters 1-11 each have a Chapter Overview and an additional one summarizes appendices A-O.

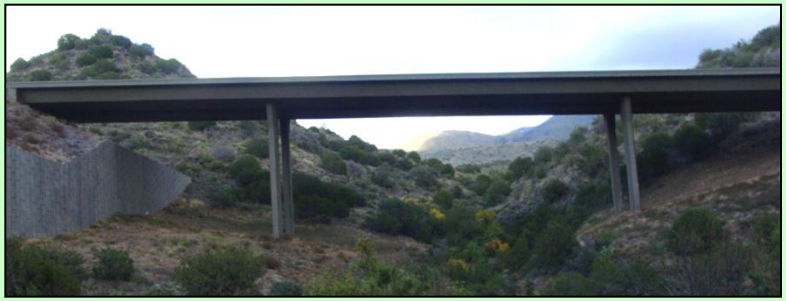
These self-paced presentations are designed for individual use or for small group presentations where discussion can be accommodated. It is helpful to have the Guidelines document as a reference when viewing the presentations.

The Chapter Overview presentations are available on the ADOT Roadside Development Section website.
http://www.azdot.gov/business/engineering-and-construction/roadway-engineering/roadway-design-standards-and-guidelines/guidelines-for-highways-on-bureau-of-land-management-and-us-forest-service-lands

Navigate the Chapter Overview by scrolling through the pages.

Arizona Department of Transportation
Guidelines for Highways
on
Bureau of Land Management and
U.S. Forest Service Lands
2008

Chapter 3: Habitat Connectivity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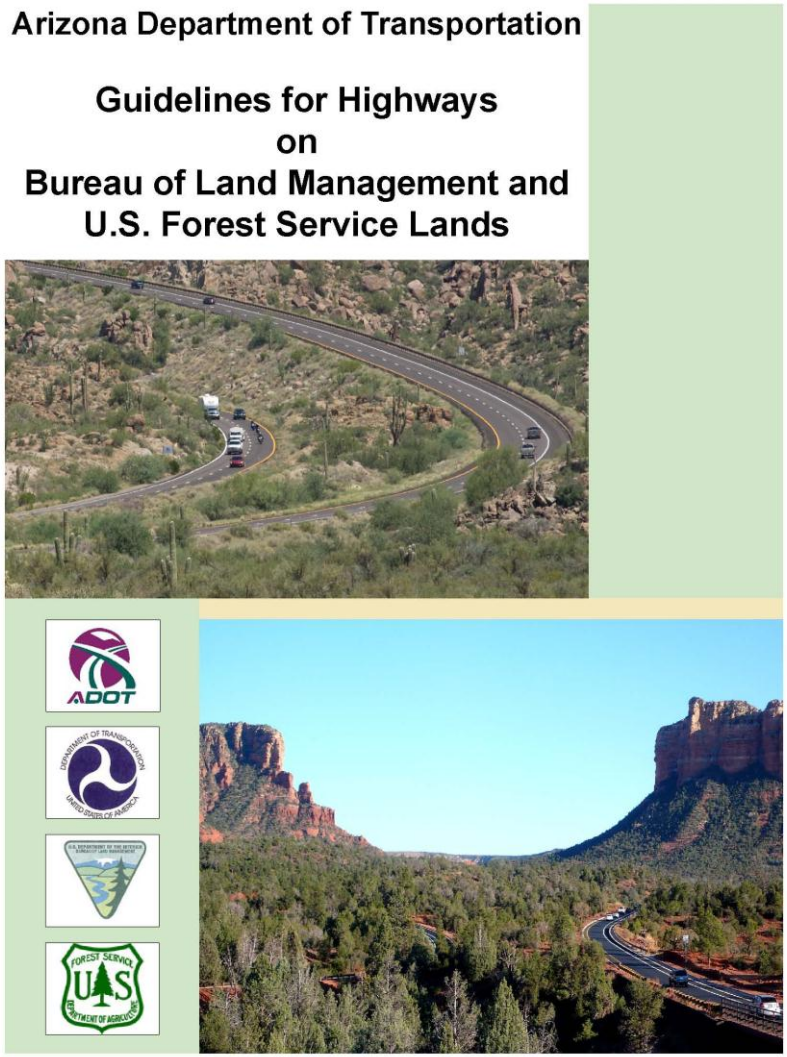

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Guidelines Contents

1 Introduction

2 ADOT Development Process on BLM and USFS Lands

3 Habitat Connectivity

4 Roadway Design and Construction

5 Major Structure Design and Construction

6 Drainage Design and Construction

7 Landscape Restoration

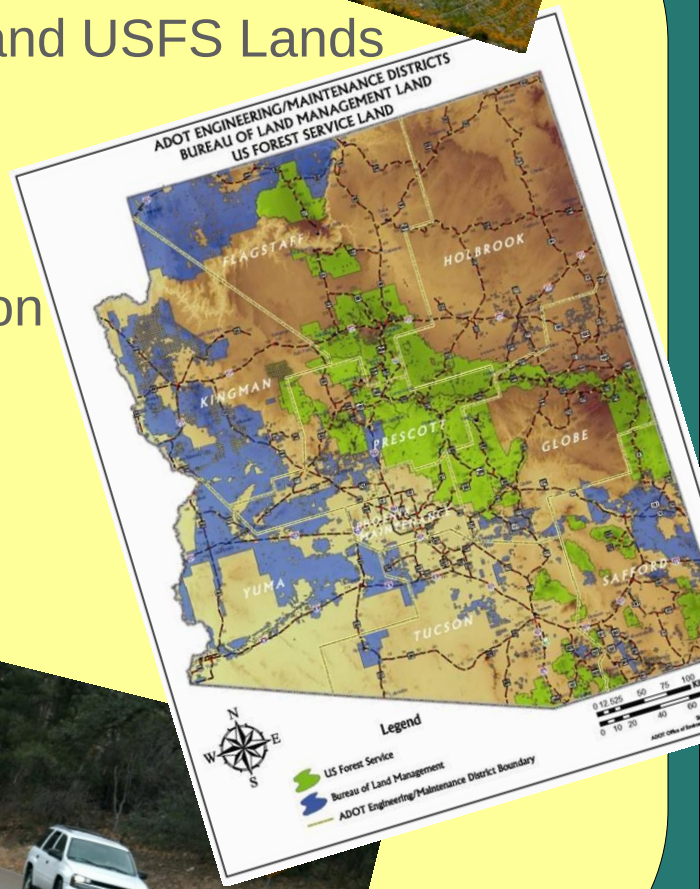
8 Storm Water and Pollution Control

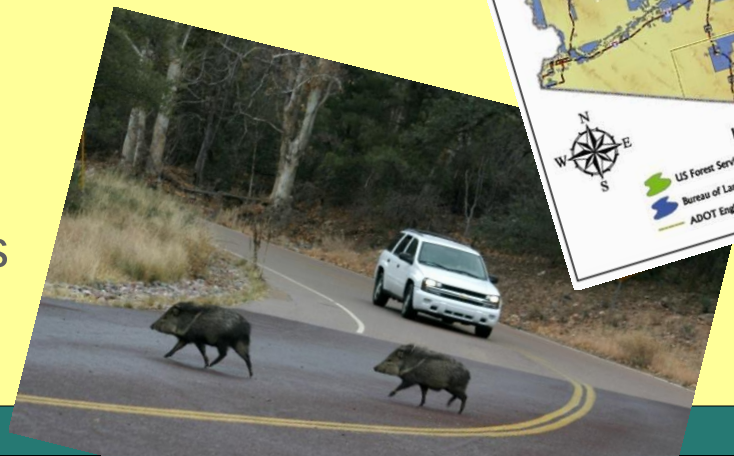
9 Material Sites

10 Construction

11 Maintenance Operations

Appendices A - O





After reviewing the Chapter 3 Tutorial you should…

- Understand habitat fragmentation and the potential impact of highway corridors on wildlife.
- Know how to make highways safer for both motorists and wildlife and more permeable to wildlife movement.
- Be familiar with design techniques to mitigate conflict between highways and the natural environment:
  - Wildlife Overpasses
  - Wildlife Underpasses
  - Fences & Walls
  - Roadside Vegetation
- Understand the importance of monitoring devices.
- Locate additional sources of information on habitat connection and wildlife crossing design.

Chapter 3 Contents

3.1 Chapter Goals

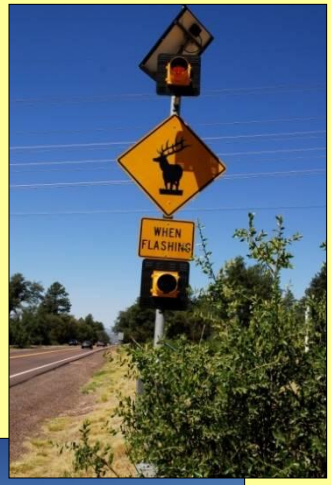
3.2 Scoping and NEPA Processes

3.3 Design Process

3.4 Environmental Mitigation

3.5 Monitoring

3.6 Additional Resources



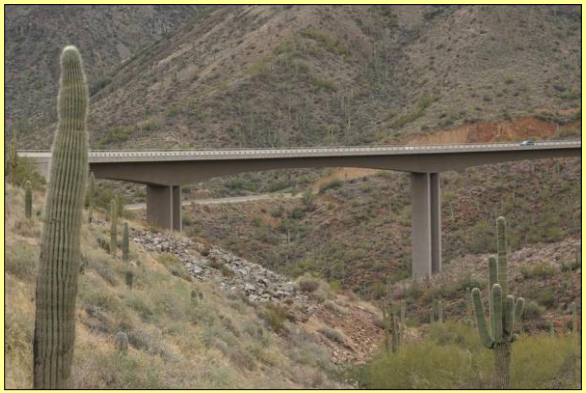
ARIZONA'S WILDLIFE LINKAGES

3.1 Chapter Goals

- Review means by which highways can be made more permeable to wildlife movement and to render them safer for both motorists and wildlife.

3.2 Scoping and NEPA Processes

- The Guidelines adopts the strategy that prevention is better than the cure regarding the negative effects of habitat fragmentation.
  - When possible, designers should avoid alignments that lead to habitat fragmentation and thus require site mitigation.
  - During the Scoping Process the project team should first evaluate the natural heritage of the project area and identify sensitive areas.
  - Time and funding required for information gathering should be included in the Scoping Process.



3.2 Scoping and NEPA Processes

- Information gathered should include:
  - Habitat types and sizes
  - Existing wildlife corridors
  - Type of anticipated conflicts between wildlife and the highway corridor
  - Potential for effective mitigation of highway impacts
  - Mapping of wildlife corridors in relation to the proposed highway corridor
- Wildlife and conservation biologists, landscape ecologists, planners, landscape architects and road engineers all play a valuable role throughout the scoping and design process.

Refer to pages 23-25 of the Guidelines for additional wildlife planning considerations during the Scoping Process.

3.3 Design Process

- The first strategy for minimizing habitat fragmentation is to avoid sensitive habitats.
- General infrastructure planning should occur early in the planning process.
- Mitigation techniques should be viewed as part of an integrated solution.
  - Different species require different mitigation measures and design criteria.
  - Mitigation measures should be cost-effective, properly located, and sensitive to anticipated future land use changes adjacent to the highway.
- There is rarely only one measure that will effectively mitigate habitat fragmentation.

3.3 Design Process

- Design Considerations

Wildlife Overpass

Wildlife Underpass

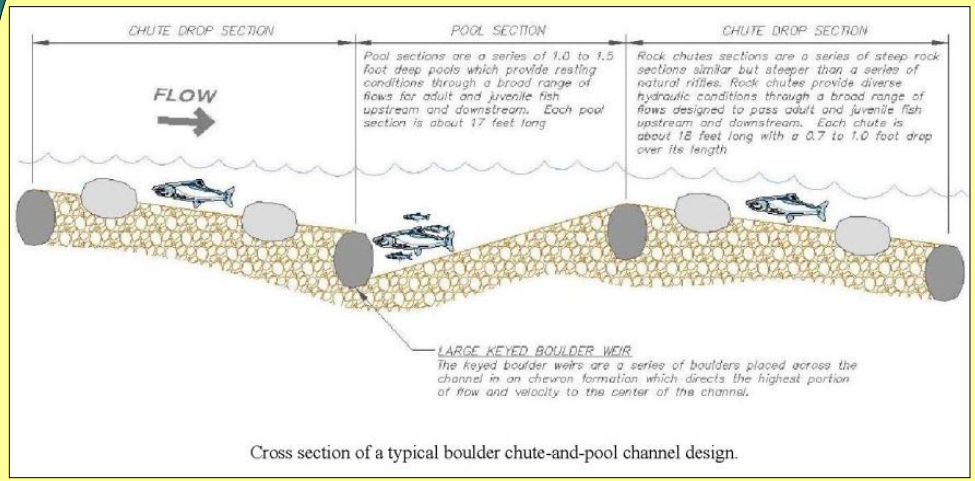
High Bridges to preserve riparian ecosystems

Box Culverts

Small Culverts

3.3 Design Process

- Design Considerations



Cross section of a typical boulder chute-and-pool channel design.

Fish Passages

Spanaway Creek, Washington

Amphibian and Reptile Tunnels

Roadside Vegetation

Fences and Walls

3.4 Environmental Mitigation

- When negative impacts from highway construction are determined to be excessive, environmental mitigation may be necessary.
- Mitigation in this context is defined as creating, restoring or enhancing natural areas in order to offset ecological damages caused by the construction of a highway corridor.
- Mitigation should be considered a ‘last resort’ solution employed only when the design techniques discussed previously in this chapter are determined to be insufficient.
- Environmental mitigation may be constructed within the highway corridor and possibly outside the easement.

3.4 Environmental Mitigation

- Environmental Mitigation Measures:
  - Restoration of degraded habitat (i.e. from overgrazing).
  - Restoration of damaged wildlife corridor (i.e. riparian area).
  - Combination of techniques to improve connectivity of isolated habitat areas.

3.5 Monitoring

- The purpose of monitoring is to measure the efficacy of the designs used to benefit wildlife in both biological and economic terms.
- Monitoring devices should be addressed during the NEPA and design processes.
- Monitoring must be tailored to the types of designs and species involved.

3.6 Additional Resources

- Eco-logical: An Ecosystem Approach to Developing Infrastructure Projects

  http://environment.fhwa.dot.gov/ecological/eco_entry.asp
- Keeping It Simple: Easy Ways to Help Wildlife Along Roads

  http://www.fhwa.dot.gov/environment/wildlifeprotection/index.cfm
- Safe Passages

  http://www.wcsnorthamerica.org/
- Arizona's Wildlife Linkages Assessment

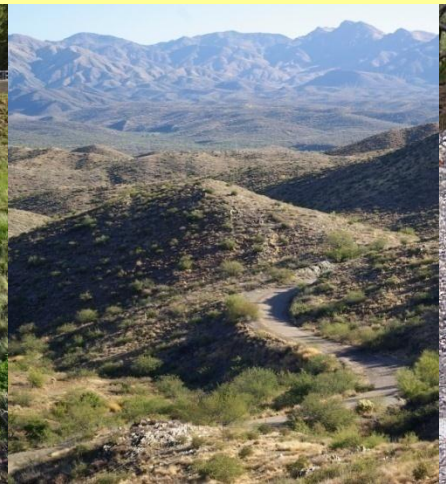
  http://www.azdot.gov/business/environmental-services-and-planning/programs/wildlife-linkages/index.asp
- Second Nature: Improving Transportation Without Putting Nature Second

  http://www.azdot.gov/docs/default-source/business/blm-second-nature.pdf
- Center for Environmental Excellence by AASHTO

  http://environment.transportation.org/

Highlights

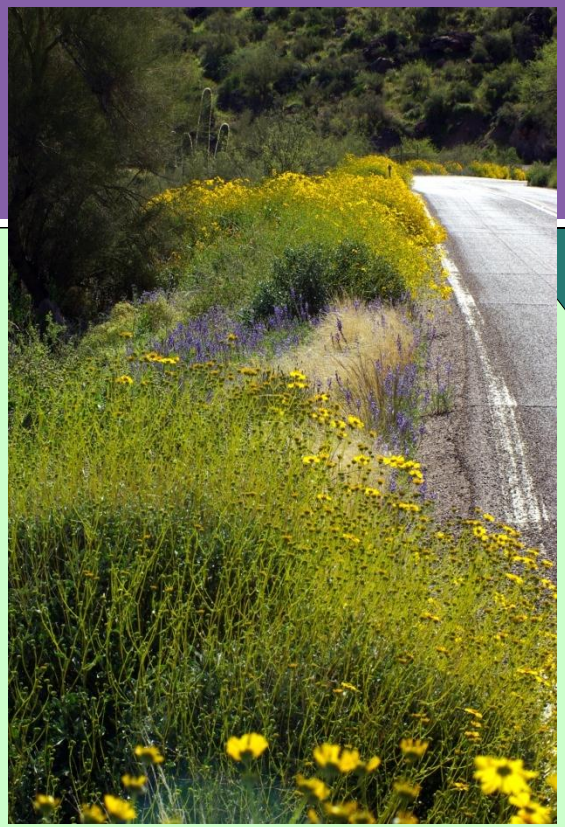
- Read Chapter 3……
  - To understand habitat connectivity and potential habitat fragmentation from highway corridors.
  - To review design techniques used to mitigate habitat fragmentation.
  - To understand the importance of monitoring current and future projects.
  - For links to additional resources on wildlife crossing design and habitat connection.



Knowledge Check: Do you……

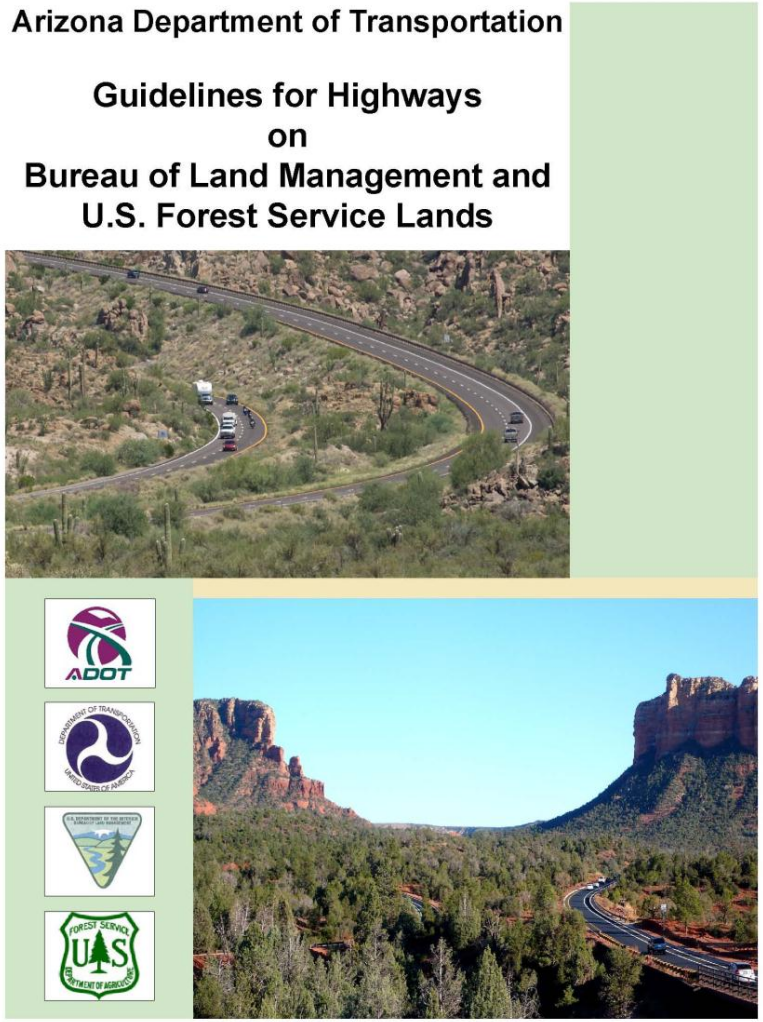
- ✓ Understand habitat fragmentation and the potential impact of highway corridors on wildlife?
- ✓ Know how to make highways safer for both motorists and wildlife, and more permeable to wildlife movement?
- ✓ Know specific design techniques to mitigate conflict between highways and the natural environment:
  - ✓ Wildlife Overpasses
  - ✓ Wildlife Underpasses
  - ✓ Fences & Walls
  - ✓ Roadside Vegetation
- ✓ Understand the importance of monitoring devices?
- ✓ Know how to locate additional sources of information on habitat connection and wildlife crossing design?

Guidelines Appendices



- Acronyms and Abbreviations
- Glossary of Terms
- ADOT-FHWA-USFS MOU
- ADOT-FHWA-BLM MOU
- Slope Design Details
- Easement Development
- Section 106 Process on Forest Service Lands
- Typical Blasting Plan Content
- Comparison of Permit Processes for Material Sites
- Signing
- Project Reference Fact Sheet
- Native Plant Salvage & Replanting Evaluation Guidelines
- References and Photography Credits
- Additional Photos (online appendix)
- Document Revision History

Document Availability



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