DECISION MAKING IN ROAD ECOLOGY: DEVELOPING THE FRAMEWORK

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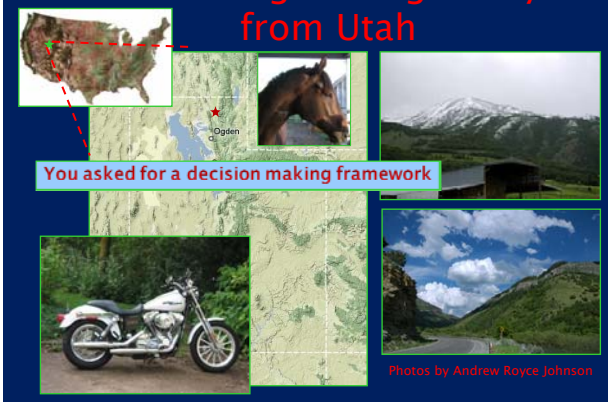
This message brought to you from Utah



Photos by Andrew Royce Johnson

My Charge for this Seminar

- What resources are available? What a road ecologist would tell you -- Meetings, Web sites, Blogs, Books, Education projects, Maps
- How do we make decisions about planning, design, implementation, maintenance, monitoring, and evaluation to implement solutions to ecological problems? What a road ecologist would tell you -- Decision Guide
- How to ensure use and application? What a web Person would tell you
- Are there key lessons for Australia What a communications person would tell you

Wildlife and Roads

Today, you get 3 for 1!

Three linked components that are immutably coupled

I'm going to talk about:

What a road ecologist would tell you (you asked)

What your web person would tell you (if you asked)

What your communications person would tell you (if you asked)

FIRST, WHAT A ROAD ECOLOGIST WOULD TELL YOU (YOU ASKED)

WHAT RESOURCES ARE AVAILABLE?

- Meetings
- Web sites
- Blogs
- Books
- Education projects
- Maps

ICOET

Rod Vander Ree (Res. Ctr for Urban Ecology, Victoria)
Jody Taylor (Monash Univ, Victoria)
Peter Spooner (Charles Sturt Univ, NSW)
at the 2007 meeting in Little Rock, Arkansas

Duluth MN, 13-17 Sept.

THE Annual Conference in the U.S. about road ecology issues
--also--
regional meetings

Some (of many) websites

The purpose of this site is to highlight – for the transportation community and for the traveling public – easy ways of reducing highway impacts on wildlife.

Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects

Appendix C (page 71)

National, Regional, and State Sites

http://www.tfhrc.gov/pubrds/05may/01.htm

http://www.wildlifeaccidents.ca/default.htm

http://www.wildlandscpr.org/

National, Regional, and State Sites

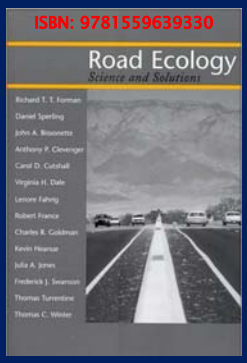
Individual states have started to post road ecology information on their sites.

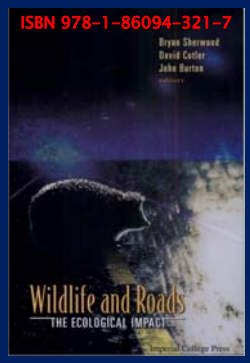
http://roadecology.ucdavis.edu/

http://www.wti.montana.edu/RoadEcology/About.aspx

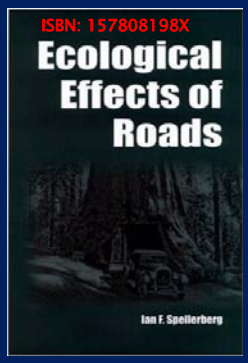
Blogs have appeared

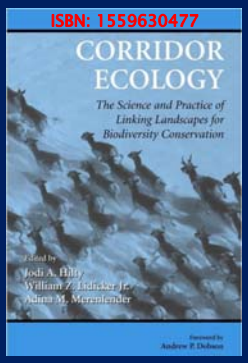
Some Books



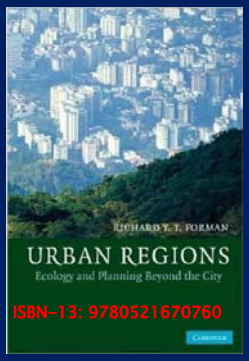


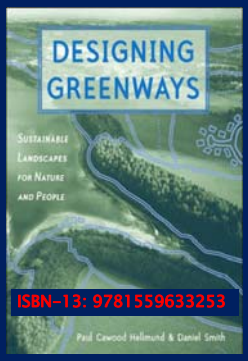
More Books



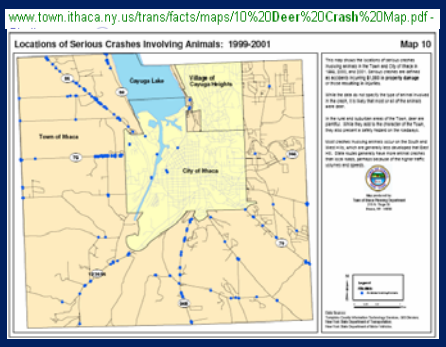


Some Related Books

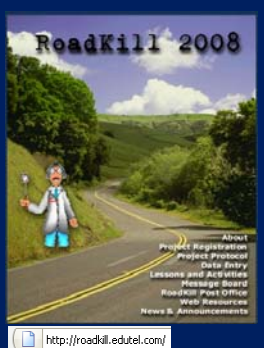




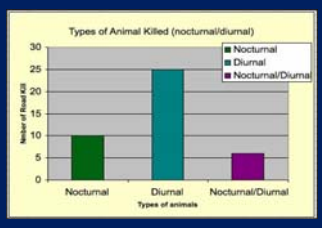
Sometimes maps are available



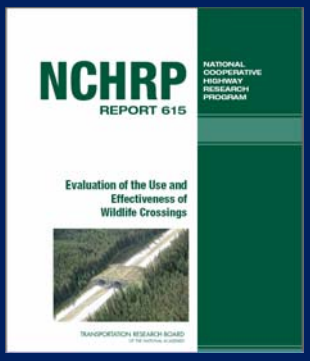
Education Projects



The RoadKill project started 16 years ago as part of a National Science Foundation teacher enhancement grant called EnviroNet, awarded to Simmons College in Boston.



THE CASE EXAMPLE FOR THE U.S.



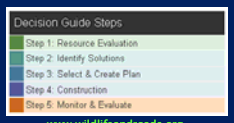
This is the first nationwide assessment of the use and effectiveness of wildlife crossings in the USA.
From this study, the first (and so far the only) U.S. National Decision Guide was developed

www.wildlifeandroads.org

This project was a four year team effort.
Our objectives were to provide guidance, in the form of clearly written guidelines for the:

Most sites for biologists
Ours for engineers and biologists

1) selection,
2) configuration, and
3) location of wildlife crossings,
4) the monitoring and evaluation of crossing effectiveness and
5) the maintenance of those structures.



Two sites for the guide

We maintain the national decision guide protocol both on our original website at USU

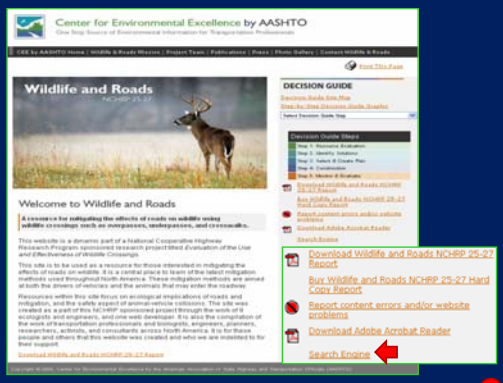
http://www.wildlifeandroads.org

and on the

American Association of State Highway and Transportation Officials (AASHTO) site

http://environment.transportation.org/environmental_issues/wildlife_roads/decision_guide/manual

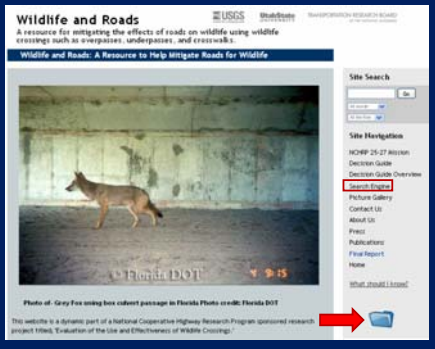
The AASHTO Site



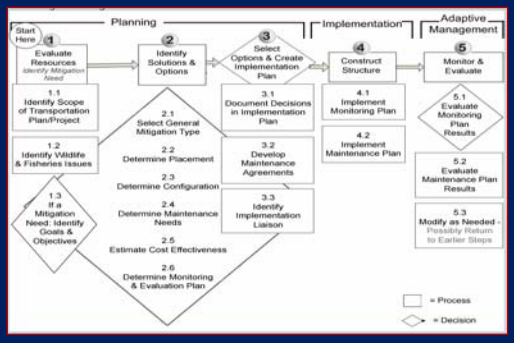
The Primary Site at USU

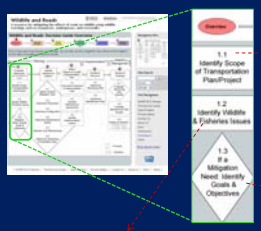
The Interactive site.

You can download pdf files as well as other information by saving it in the blue folder and retrieving it at the end of the session.



OVERVIEW OF THE SITE
the necessary components





Identify Scope of Transportation Plan/Project

1.1 Identify Scope of Transportation Plan/Project: In this very first step users will determine the spatial and temporal (time) extent of the proposed transportation program or project, and the information resources necessary to help predict potential effects of the plan/project.

1.1.1: Introduction to the Road Planning Context
1.1.2: Assessing Point in the Planning Process & Temporal Constraints
1.1.3: Assessing the Spatial & Landscape Scope of Plan /Project
1.1.4: Determine Road Classification, Potential Agency Partners

If a Mitigation Need: Identify Goals & Objectives

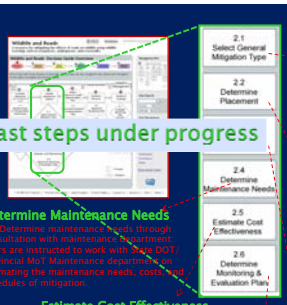
1.3 Identify Goals & Objectives: If the user has decided from the first two steps that there is a need to mitigate for wildlife, then the potential effects of the plan/project are listed and the possible solutions and the goals of those solutions are developed here. Users will define performance measures or goals of mitigation and identify methods to evaluate how those goals are met over the long term.

1.3.1: Outline of possible goals and performance measures and methods

Identify Wildlife & Fisheries Issues

1.2 Identify Wildlife & Fisheries Issues: We direct the users to a series of steps which first provide a literature base on the effects of roads, and the need for permeability for wildlife. The guide then instructs the user in identifying the species, natural areas, and natural processes that may be affected by the plan/project. At the end of this step, the user will decide if there is a need for mitigation and whether to proceed with the decision guide.

1.2.1: Literature on Effects of Roads & Need for Permeability
1.2.2: Literature on Animal-Vehicle Collisions & Their Ecological and Societal Costs
1.2.3: Determine Ecologically Important Areas Within and Near Plan/Project
1.2.4: Determine Species Potentially Affected by Plan/Project
1.2.5: Determine If any Animal-Vehicle Collisions Safety Concerns in the Plan/Project
1.2.6: Investigate If Landscape Linkages Have Been Identified in The Area
1.2.7: Review Regulatory Reasons For Being Concerned About Wildlife
1.2.8: Summarize Results



Select General Mitigation Type

2.1 At this point in the process the user will have identified the complement of species that may be affected by the potential transportation project as well as the ecologically important areas outlined in steps 1.2.3 – 1.2.4. In this step the user decides the primary target species of the planned mitigation and selects the most feasible mitigation type. These decisions are based on potential negative effects on species, ecological and landscape features, engineering and cost constraints, and the need for accomsamying mitigation features, e.g., fences and road right of way (ROW) escape ramps.

Determine Placement

2.2 The placement of wildlife crossings is an important step in the creation of mitigation for wildlife and depends on ecological and safety factors. Successful crossing placement relies on understanding where wildlife is most likely to approach a road. It is clear that places where animals are hit by automobiles on roads are not necessarily the same places where they first approach the road Right-of-Way. Effective mitigation placement can first be generalized to certain sections of road through coarse scale analyses (e.g., hotspots of Wildlife-Vehicle Collisions and location of carcasses), and then more specifically placed with finer scale methods. These methods are described in the steps outlined below.

Determine Maintenance Needs

2.4 Determine maintenance needs through consultation with maintenance department: Users are instructed to work with State DOT/ Provincial MoT Maintenance departments on estimating the maintenance needs, costs, and schedules of mitigation.

Estimate Cost Effectiveness

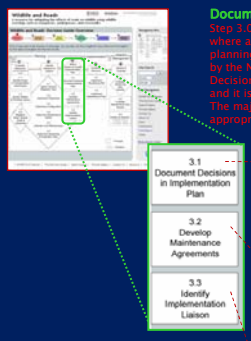
2.5 Estimate Cost Effectiveness Based on Long Term Ecological and Safety Benefits: Users are instructed to gather information related to the ecological and safety benefits of reduced wildlife-vehicle collisions in conjunction with ecological benefits of permeability and the costs associated. With mitigation to be inserted into a standard benefit cost ratio.

Determine Configurations

2.3 Determine configuration requirements for mitigation including dimensions, materials, bottom surface, lighting, noise considerations, human use, and engineering requirements. In this step the user will work through the ecological and engineering requirements of creating the mitigation.

Determine Monitoring & Evaluation Plan

2.6 Determine Monitoring and Evaluation Plan: This step explains to users how to determine success for a mitigation project, identify methods to measure effectiveness, design the monitoring plan, and how to evaluate and proceed with results of monitoring plan in an adaptive management approach.



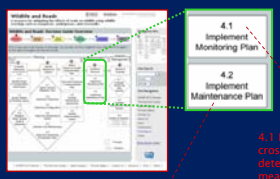
Document Decisions in Implementation Plan

Step 3.0 is a decision node because it is the point in the process where all the information from Step 2.0 is integrated into the larger planning and decision-making process. If the planning level is controlled by the NEPA process, then Step 3.0 would correspond to the Record of Decision or Decision Notice. Each agency will have its own process for this and it is outside the scope of this work to detail the processes involved. The major product of Step 3.0 is some form of decision on the mitigation appropriate for the project

3.1 Document Decisions in Implementation Plan
3.1.1: With project planning stakeholders, identify and agree on an implementation plan approach
3.1.2: Agree to all provisions in the legal planning document (NEPA decision document or other) in writing
3.1.3: Initiate Monitoring Plan

Step 3.2 Develop Maintenance Agreements
3.2.1: Determine the responsible agency for each aspect of maintenance work
3.2.2: Determine the schedule of required maintenance for each structure or component such as fences
3.2.3: Determine the funding source for each aspect of maintenance over the life of the structure
3.2.4: Consider how the maintenance agreement can be used within the stakeholders legal avenues to provide for very long term duration

Step 3.3: Identify Implementation Liaison
3.3.1: Identify the appropriate skills needed for a liaison
3.3.2: Identify the funding source and term of agreement



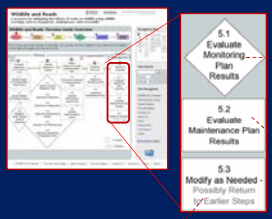
Implement Monitoring Plan

4.1 During and after construction of the project's wildlife crossing structures, the monitoring plan is a key tool to determine the effectiveness of the mitigation. Performance measures identified in Step 1.3 will assist the implementation liaison in determining if project objectives are being met. Regular monitoring and reporting of results to stakeholders can raise awareness and promote continue support for the project as well as alert decision makers to potential outcomes that may call for adaptive management actions to be taken. Regular reports help establish and maintain mutual respect and trust. The monitoring plan is likely to extend longer than the construction phase. Ensure that this possibility is considered during the planning phase.

Implement Maintenance Plan

4.2 The maintenance plan begins when needed, with elements of wildlife crossing structures possibly requiring evaluation and possibly maintenance prior to the completion of construction of the project. Regular maintenance is more likely with lower durability items such as fences, but may also be a result of damage from construction activities. Continual attention to maintenance is the key to the proper functioning of structures

Bissonette, J. A., ed. 1997. Wildlife and Landscape Ecology: Effects of Pattern and Scale. Springer-Verlag, New York, 410pp.



WHAT IS ADAPTIVE MANAGEMENT, REALLY?

16
Adaptive Policy Design: Thinking at Large Spatial Scales
Carl Walters Pages 386-394
in Bissonette, J.A.,ed. 1997. Wildlife and Landscape Ecology: Effects of Pattern and Scale. Springer-Verlag, New York, 410 pp.

Modify as Needed

5.3 If an objective or performance measure is not being met, then it is important to reconsider. The Decision Guide can be re-entered at any point to help plan more effective mitigation measures based on the new information obtained from the evaluation and adaptation process. An effectively written monitoring plan will incorporate a process to periodically notify stakeholders of the success of mitigation measures in meeting objectives..

Eva

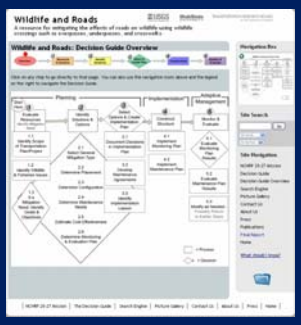
5.2 ... any monitoring, because of the continual need over the life of the crossing structures. Therefore, it is important to review the maintenance plan to ensure that the objectives are being met with regards to the effectiveness of the components of crossing structures. Because the field of transportation ecology is increasing in knowledge rapidly, it is possible that maintenance plan monitoring will show that replacement of some components with new technology is warranted. Consider replacing inefficient and outdated structures to meet the intent of the planners. Consider that the ecological context may change over the life of the crossing structures, and other technologies may be more appropriate in the future.

The most neglected part

SECOND, WHAT YOUR WEB PERSON WOULD TELL YOU (IF YOU ASKED)

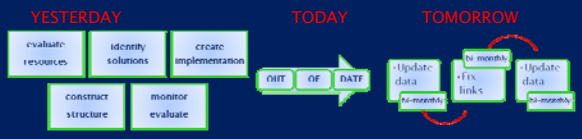
Two Necessary Functions

- Development of the site
  - 2+ years
  - web guy, research associate, student help
- Maintenance of the site
  - continued updating with new data
  - fix broken links

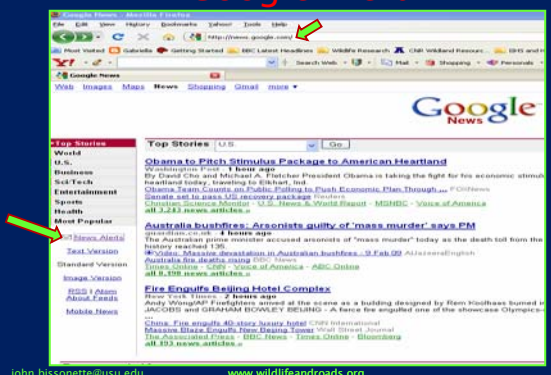


If you don't commit to the maintenance of the site, you are wasting your time and money with the development

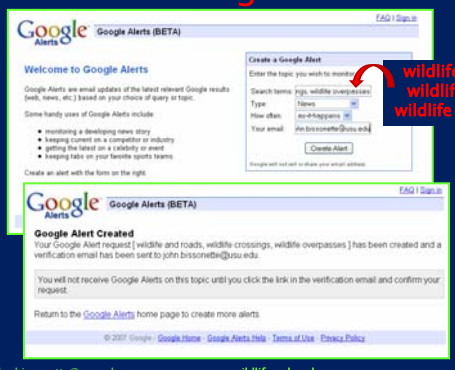
"by 2010 the amount of digital information in the world will double every 11 hours"
IBM Global Technical Services white paper published in July 2006
"The toxic terabyte: How data-dumping threatens business efficiency."



Keeping up to Date (1) Google Alert



Keeping up to Date (2) Google Alert



Keeping up to Date (3) Google Alert

Electronic journal access

Detecting Broken Links

"One of the most important indicators of a high-quality site is the absence of broken links."

"There is nothing worse for a user than coming across either a link that leads nowhere or an empty square instead of an image. Broken links ruin your reputation and bring down your rating on search engines. For example, Google rates your site lower if it finds broken links there. Broken links are not just errors in the design of a site that can be overlooked, but they can cost you rating, traffic, and money."

– Web Tweak Tools –

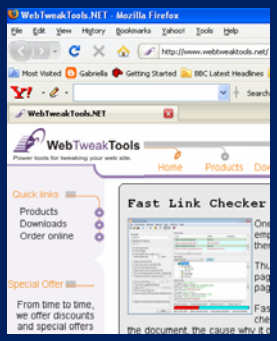
Detecting Broken Links

Fast Link Checker is an automated process to check your website for broken links. It scans through a website and attempts to access all internal and external links.

Suspect Links	Broken Link (originating Page)	Link Text (location)
http://environment.transportation.org/environmental%5Fissues/wildlife%5Froads/decision%5Fguide/manual/1_1.aspx	http://www.environment.fhwa.dot.gov/integ/	Line: 110, Col: 4 when you click on "Federal Highways Planning and Environmental Linkages"
http://environment.transportation.org/environmental%5Fissues/wildlife%5Froads/decision%5Fguide/manual/1_2.aspx	http://www.dfo-mpo.gc.ca/far-rha/7_e.htm	Line: 507, Col: 4 when you click on "Transport Canada New Elements of the Fisheries Act"
	http://www.dnr.state.md.us/greenprint/	Line: 472, Col: 4 when you click on "Maryland's GreenPrint Program Identifying Green Infrastructure or Lands"

When a link is unreachable, generates an error message, or takes too long, this is detailed in the link report. The report provides the links that are suspect, their originating page, and the link text to help locate the issue. You can then use this report to repair or remove any broken links.

Detecting Broken Links



Occasional issues with false positives occur if a server is having "issues"
The tool is helpful, especially when agency websites are redesigned and messes with websites that refer to it.

For more information about Fast Link Checker, visit the Web Tweak Tools website at
http://www.webtweaktools.net/

The #1 Site
How to get noticed

- Leading headers

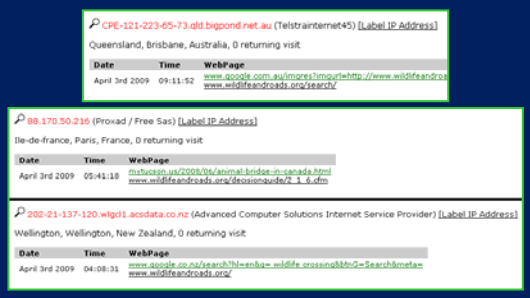
- Imbedded URLs
- Photos with watermarks
- (but Google changes algorithms)

Assessing Use
StatCounter.com

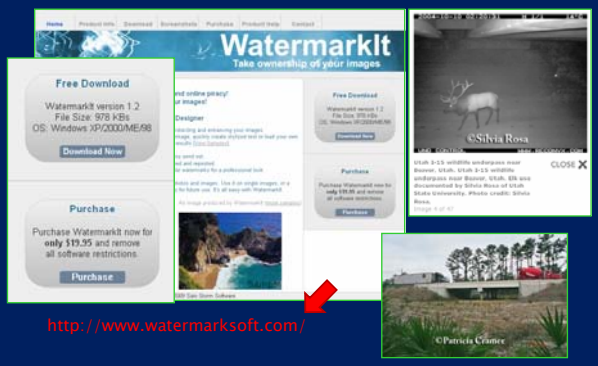
Assessing Use
StatCounter.com

Assessing Use StatCounter.com

Who is visiting the site? (~35% international)



Watermarks for pictures



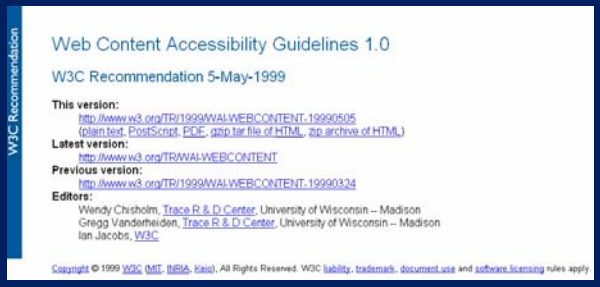
http://www.watermarksoft.com/

Ensuring Use and Application

- Pertinent keywords in the headings
- Pages structured with Level 1 headings being the most important keywords, Level 2 headings being next important, and so on
- Pages used valid XHTML (Extensible Hypertext Markup Language) and CSS code (cascading style sheets – formatting instructions for what webpage content should look like)
- Pages compliant to at least WAI (web accessibility) Level A (Priority 1) standards http://www.w3.org/TR/WCAG10/
- In many cases we exceeded level A standards

WAI Level A (Priority 1) standards

http://www.w3.org/TR/WCAG10/



THIRD, WHAT YOUR COMMUNICATIONS PERSON WOULD TELL YOU (IF YOU ASKED)

BIOLOGISTS AND ENGINEERS THINK DIFFERENTLY RESPECT THOSE DIFFERENCES

Lessons for Biologists (1)

- Engineers do not think like biologists
- Your engineering colleagues are invaluable in making mitigation work
- Realize that the funds for any mitigation project are decided early in the planning process

Lessons for Biologists (2)

- Work with your engineering colleagues early in the planning stages of a project
- Engineers appreciate standards to work from
- Comprise is usually necessary

Lessons for Engineers (1)

- Biologists do not think like engineers
- Be patient with your biologists colleagues. They are working with complex, interactive, contingent feedback systems (middle # systems)
- Often biologists do not have the hard data and must rely on their best intuition of what will work

Lessons for Engineers (2)

- Standards for crossing structures are difficult because the animals that we design them for are different
- As a rule of thumb, when it comes to crossing structures, larger and wider are better, and overpasses are better than underpasses (for large animals)
- Compromise is usually necessary

Summary & Take-Home Lessons for Australia/New Zealand

If it was easy, it would have already been done!

hubris!!

Finding ... will b... ms that ...kes:

SAFE ROADS
PERMEABLE LANDSCAPES

A COLLECTIVE VISION OF WHAT THE FUTURE SHOULD LOOK LIKE

A LONG TERM COMMITMENT TO WORK TOGETHER

PERSISTENCE TO KEEP WORKING WHEN THE GOING GETS TOUGH

COMMUNICATION, COMMUNICATION,COMMUNICATION

AND AN UNLIMITED DOSE OF TOLERANCE FOR DIFFERENT VIEWS

Thank You. The Welcome Mat is out. Come to Utah!

The hearts of America are with you God Bless the Aussies