Highlights from the International Conference on Ecology and Transportation (ICOET):
Applications of Eco-Logical from the U.S. and Beyond
Wednesday, October 26, 2011
1:00 – 2:30 PM Eastern

Presenters
• Debra Nelson, New York State Department of Transportation
• John Walewski, Texas A&M University
• Kelly McAllister, Washington State Department of Transportation
• Henrik Wahlman, Swedish Transportation Administration

Moderated by Mary Gray, Federal Highway Administration, Office of Project Development and Environmental Review
Research
Collaboration
Networking
International
Designed to Share what has been done to Promote Continuous Process Improvement
ICOET 2013 – ARIZONA
http://www.icoet.net/
Questions?

Eco-Logical:

Eco-Logical Webinar Series:
A Systems View of Sustainability

Incorporating Sustainability into NYSDOT’s Strategic, Tactical and Operational Decisions

Debra Nelson, NYSDOT
dnelson@dot.state.ny.us
Sustainability is Overarching

Environment
- Environmental Initiative
- Climate Change
- GreenLITES
- Land Use Planning
- Smart Growth
- Ecosystem Based Management
- Context Sensitive Solutions
- Bike/Pedestrian
- Livability
- Safety
- Safe Routes to School
- Transit-oriented Development
- Complete Streets
- Asset Management
- Travel Demand Management
- Preservation Strategy
- Economic Development
- Energy Efficiency
- Scenic Byways
- Reuse/Recycle
- Green/Blue Highways

Social

Economy
### Sustainability Decision Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Why</strong></td>
<td><strong>Strategic</strong> – Integrate Transportation and Natural Resources Planning to support a sustainable society</td>
</tr>
<tr>
<td></td>
<td><strong>Tactical</strong> – Support a sustainable transportation system that protects and enhances natural systems</td>
</tr>
<tr>
<td></td>
<td><strong>Operational</strong> – Forward sustainable projects and actions that reduce environmental impacts and resource consumption</td>
</tr>
</tbody>
</table>
Perspective: West Branch
Fish Creek watershed comprises 0.4% of the total
land area of NYS

Highway length (centerline mi) = 337.8 mi
Number of highway-stream crossings = 297

Watershed area =

Approx. 1.2 million culverts total in NYS
(state, county, local)

We can't fix them all!
InterACT – Multi-agency team “committed to ensuring that stream crossings are designed, installed and maintained in a manner that protects the ecological integrity of aquatic systems, while accommodating practicable technology, engineering criteria and human safety.”
Sustainable Decisions: Science-based, Prioritized

(Tactical)

Michelle Brown, Principal Investigator
Comprehensive Wildlife Conservation Strategy (CWCS) to address the wildlife species in greatest need of conservation in the state. Defines a vision and establishes a strategy for state wildlife conservation and funding.

Strategies for a New Age: New York State’s Transportation Master Plan for 2030 articulates a long-term, intermodal vision of the State’s future transportation system and provides policy level guidance to achieve that vision.
Forward Four – Guiding Principles

- Preservation First
- System Not Projects
- Make It Sustainable
- Maximize Return on Investment
“With Great Power Comes Great Responsibility”

Why
What
How

Quote from Spiderman movie (2002)
Ecosystem-Based Protocols for Systematic and Sustainable Roadside Development

Applications of Eco-Logical Webinar
October 26, 2011
John Walewski, Ph.D.
Department of Civil Engineering, Texas A&M University
Project Team Lead:

Sean Compton  
Principal  
TGB Partners, Inc.  
Austin, Texas

Dr. Steve Windhager  
Director, Landscape Restoration  
Lady Bird Johnson Wildflower Center  
University of Texas at Austin

Dr. John Walewski  
Department of Civil Engineering  
Texas A&M University
# U.S. Drought Monitor

## Texas

### August 16, 2011

Valid 7 a.m. EST

### Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th>Current</th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.07</td>
<td>99.93</td>
<td>99.72</td>
<td>98.36</td>
<td>92.78</td>
<td>74.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Last Week (08/09/2011 map)</th>
<th>0.07</th>
<th>99.93</th>
<th>99.48</th>
<th>97.99</th>
<th>94.27</th>
<th>78.26</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>3 Months Ago (05/17/2011 map)</th>
<th>0.00</th>
<th>100.00</th>
<th>97.01</th>
<th>92.40</th>
<th>80.02</th>
<th>47.87</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Start of Calendar Year (12/28/2010 map)</th>
<th>7.89</th>
<th>92.11</th>
<th>69.43</th>
<th>37.46</th>
<th>9.59</th>
<th>0.00</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Start of Water Year (09/28/2010 map)</th>
<th>75.57</th>
<th>24.43</th>
<th>2.43</th>
<th>0.99</th>
<th>0.00</th>
<th>0.00</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>One Year Ago (08/10/2010 map)</th>
<th>90.68</th>
<th>9.32</th>
<th>2.45</th>
<th>0.22</th>
<th>0.00</th>
<th>0.00</th>
</tr>
</thead>
</table>

**Intensity:**

- **D0 Abnormally Dry**
- **D1 Drought - Moderate**
- **D2 Drought - Severe**
- **D3 Drought - Extreme**
- **D4 Drought - Exceptional**

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The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, August 18, 2011
Laura Edwards, Western Regional Climate Center
Problem & Solution

- Central Texas – among the fastest growing regions in the country
  - Transportation network lagging
  - Sensitive ecology
  - New funding tools and authority at local level

- Williamson County Texas assertive in funding mobility needs using a road bond program and pass-through financing

- Use of existing design and construction guidance, standards, & specifications...
  - State-wide with minor modifications
  - Not consistent with site ecology
  - Not sustainable?
    - Environmental...
    - Climate change...
    - Economical...
    - Social ...

- Eco-Logical concepts extended to construction specifications and ownership
Current Practices - The high price of a low cost solution to roadsides
Roadside Installation and 20 years Maintenance – Total Cost

<table>
<thead>
<tr>
<th>TxDOT Urban Spec</th>
<th>TxDOT Rural Spec</th>
<th>Protocol Solution A</th>
<th>Protocol Solution B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bermuda sod, TxDOT seed mixes, mowings on the entire ROW.</td>
<td>TxDOT seed mix, mowings to the entire ROW.</td>
<td>Sustainable solution on 100% of the ROW.</td>
<td>Sustainable solution with 15% of vegetation maintained.</td>
</tr>
<tr>
<td>$204,210</td>
<td>$163,895</td>
<td>$160,075</td>
<td>$134,460</td>
</tr>
</tbody>
</table>

**Characteristics**
- TxDOT Seed Mix
- 3 Mowings per year throughout ROW

**Characteristics**
- Compost and native seed mix
- Rock berms and mulch fiber rolls
- 3 mowings per year in safety strip only
Ecoregions of Williamson County

Limestone Cut Plains

Common Plants:
- Blackjack Oak
- Little Bluestem
- Yellow Indiangrass
- Texas Indiangrass
- Sideoats Grama
- Common Curlymesquite

Blackland Prairie

Common Plants:
- Big Bluestem
- Yellow Indian Grass
- Switchgrass
- Sugar Hackberry
- Elm
- Ash
- Eastern Cottonwood
- Pecan

Edwards Plateau

Common Plants:
- Juniper
- Oak
- Mesquite
- Sideoats grama
- Little bluestem
- Muhly grass

Post Oak Savanna

Common Plants:
- Post Oak
- Silver Bluestem
- Little Bluestem
- Brownseed Paspalum
- Hackberry
- Yaupon
Example Erosion Control BMP - Modified Mowing Practices

Reduce mowing to safety strip.

Benefits:

- Reduce maintenance costs
- Reduce potential erosion
- Stabilize slopes
- Improved safety for workers and motorists
- Contributes to a “sense of place”

Limitations:

- Challenges public perception of roadway aesthetic
Findings/Recommendation

- Political will & end-user buy-in
- Life cycle cost does not equal construction cost
- Design to local environmental conditions
- Address solutions comprehensively with community buy-in
- Guidance on planning, design, construction & maintenance
  - Formatted as traditional construction specifications
- Separate landscape construction contract
- Adequate supervision of landscape construction
- Work with seed industry on developing adequate supply
- Develop and promote program for adjacent land owner seed collection
- Monitor and assess BMP/Protocol performance
Washington Connected Landscapes Project: Statewide Analysis
Final statewide habitat connectivity analysis from the Washington Habitat Connectivity Working Group
National vegetation classification standard:
Five major vegetation associations

Vancouverian Forests
Rocky Mountain Forests
Semi-Arid communities
Subalpine communities
Alpine communities
16 Focal Species
Landscape integrity approach

*Focuses on the stage, not the actors*
Core habitat (green) and linkages (yellows, reds, & blues) combine to produce a connected habitat network.
Habitat networks & highways
Landscape analysis in early planning – green infrastructure

The Götaland line example
The Gotaland line in Sweden

- Connecting Stockholm – Gothenburg with a new, high speed railroad
- Several separate projects.
- We studied the major part, 230 km Linköping-Borås
- Estimated cost (15 billion USD)
- Top speed 250 km/h (320 km/h)
- Initial study phase (geography barely set)
Road- and railroad-planning thus far...

- Knowledge too late!
- Small potential to change the planned project
- Based on knowledge about legally protected objects/areas
Process questions:

- Where should the line NOT go?
- Areas that demands more detailed investigations?
- Different landscape sensitivities?

The aim was to create a common decision base material for both cultural, visual and ecological considerations.
Delimited area passed on to next planning stage.

Areas/structures/functions demanding special care and consideration. Ecologically/visually/culturally important areas, (usually also) areas that may complicate the legal permission process. Areas potentially driving costs.
Landscape character assessment, a process

Aim: Deconstruct the landscape and find manageable and common characters.

• Characters can be evaluated against the railway and give understanding of what consequences a railway might give.

• Broad scale, cross-disciplinary. We did it in a Team with several experts.(natural, cultural, visual and others)

• Starts in the FIELD! Get your team out!

• Iterative process

• LCA is coupled with deeper thematic studies
Green infrastructure: What did we do?

- GIS-based analysis on existing data
- Analysis of ecosystem functionality
- Identify biologically rich landscapes as well as large scale ecological functions
Core tracts of forest

Indata: National forest inventory, Nature reserves etc.
Core systems – Analyzing functional connections

• Key species are selected (relevant scale, knowledge about biology/ecology)

• Based on threshold values for these species:
  - Least area
  - Dispersal distance
  - Least number of core habitats
  - Least total area of core habitats
Functional systems of meadows and pastures
(National perspective)
Protected areas

Tracts with high biodiversity
Conclusions

• The legal permitting process has to stop focusing on whether biodiversity hotspots are protected by legislation or not.

• With analysis on the landscape level early on, high value areas and systems can be avoided.

• Areas or objects with high conservational/biological value that cannot be avoided can be highlighted and more in depth analysis on how to handle them can start early in the next planning phase, avoiding future bottlenecks.

• Cross-disciplinary approach can balance natural, cultural and visual aspects against each other. Reduces potential conflicts between fields of expertise later in the process and gives a better knowledge base. Was very well received by the public, NGOs and the permitting agencies and authorities. And it is FUN!

• Knowing the landscape early on makes it possible to influence budget, alignment and modeling.