How to Approach your Transportation Environmental Needs Eco-Logically

Kate Kurgan, American Association of State Highway Transportation Officials

David Williams, Federal Highway Administration

Sean Connolly & Tucker Creed, South Carolina Department of Transportation

Kate Zielke, North Central Texas Council of Governments

Suzanne Melim, California Department of Transportation

January 31, 2017

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

- Landscape-scale approach to transportation project development.
- Transportation agencies collaborate during the planning process.
- Lead to agreed-upon mitigation strategies and timely permit decisions.
Eco-Logical Approach 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
AASHTO & FHWA
Contact Information

Kate Kurgan, AASHTO
kkurgan@aashto.org
202-624-3635

Kevin Moody, FHWA
Kevin.Moody@dot.gov
404-562-3618

David Williams, FHWA
david.Williams@dot.gov
202-366-4074

Mike Ruth, FHWA
Mike.ruth@dot.gov
202-366-9509
Eco-Logical Website and Tools

https://www.environment.fhwa.dot.gov/ecological/implementingecologicalapproach/default.asp
Today’s Agenda

- **Sean Connolly**: Applying Eco-Logical to establish solutions for programmatic mitigation bank needs.

- **Kate Zielke**: Collect and organize geographic data to identify solutions for future conservation/mitigation sites.

- **Suzanne Melim**: Benefits of implementing Eco-Logical to planning wildlife crossings.
SCDOT Mitigation Strategy
Eco-Logical 2017
SCDOT’s Vision

The vision of SCDOT is to deliver, operate and maintain a world-class, 21st century, multimodal transportation system that enables the Palmetto State to continue to grow its economy, enhance communities, and improve the environment.
What is SCDOT’s Mitigation Strategy?

• To solve the anticipated mitigation issue for projects prior to entering the NEPA phase to have more economical and readily available mitigation options to deliver projects while also benefitting the resources.

• Improve quality of project outcomes and improve scheduling for safer, improved infrastructure.

• Begin development of a framework to improve watershed and ecosystem health as well as increase connectivity and conservation.

• To develop a framework and foundation for an interagency collaborative and ecosystem approach to developing infrastructure projects.
SCDOT’s Historical Mitigation Methods
Problem Statement

- Few Mitigation Banks
- No Coastal Stream Mitigation Banks
- Concern due to limited credits available even within approved banks
- Permittee-Responsible Mitigation is not economical for smaller projects
- Project delays and complexities
- Volume of Projects
- Increasing Costs
Volume of Projects
Projects with Possible Impacts
Two areas that immediately jump off the map

Zero bank coverage for these areas of the state

Also Coastal Area Wetlands Only

According to RIBITS data, all approved mitigation banks in SC have an average of 54% credits remaining for release.

* All data is per RIBITS website as of 7/1/16.
** Remaining credits for release is the baseline since not all ledgers are completely accurate on RIBITS. By using the remaining credits to be released, one can determine the remaining life of the bank more accurately.
138 projects identified
Projects Lacking Bank Coverage

Short Term Projects With No Mitigation Banks

Legend:
- DOT_MA_no_bank
- DOT_CD_no_bank
- STIP_widenings_no_bank
- HUC8_projects_with_no_banks_PRIORITY1
- HUC8_projects_with_no_banks
- sc8unit

Priority Watersheds

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*All data is per RIBITS website as of 7/1/16
**Remaining credits for release is the baseline since not all ledgers are completely accurate on RIBITS.
By using the remaining credits to be released, one can determine the remaining life of the bank more accurately.
Increasing Compensatory Mitigation Costs
Implementing Eco-Logical Steps

1. Build collaborative partnerships & vision
2. Characterize resource status
3. Create REF (USC Forecast Tool)
4. Assess effects on conservation
5. Identify & Prioritize actions
6. Develop crediting strategy (AMP)
7. Develop agreements
8. Implement agreements
9. Update REF over time
REF STEP 3 – Forecast Impacts

Where are the future road projects?

Where are the wetlands and streams?

Where are the available credits?

Ok, specifically where will the surface/shoulders be?

NWI
NHD
& More

Where are the wetlands?

MODEL

Impacts:
Wetland acres
Stream feet
Database

- NLCD
- National Wetlands Inventory
- USDA Soils
- LiDAR
- Imagery
- Historical maps
# Data Sources

Sample of data sources that will be utilized

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<th>Source</th>
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Example: USC-SCDOT Public Access Site

www.wetmit.org
Desktop Road Modification Tool

Wetlands Impacts  Stream Impacts
It’s NOT all about SCDOT

Together, partners can work to implement an ecosystem approach to infrastructure projects. In doing so, substantive contributions to species, watershed, and ecosystem health and recovery can be made that are sometimes missed when regulations are administered on a project-by-project basis.

( ECO-Logical April 2006)
2nd Phase - Advanced Mitigation Partnership

**Who:** SCDNR, SCDHEC, USACE, USFWS, SCDOT, NMFS, SCFC, SCDOT, FHWA, USEPA

**When:** AMP meets every other month

**What:** Evaluate USC Forecast Model, SCDOT critical watersheds, and Short term/ Long Term Improvements

**Why:**

*Image*
1. Discuss Absolutes for Mitigation.

2. Evaluate and incorporate overlapping Agency Missions and develop AMP step by step (e.g. 303(d) list, Fish Passage).

3. Share data between each agency.

4. Evaluate watershed’s needs and best way to protect and/or restore. (stream buffers, corridors, stormwater retrofit)
In other words...

- Increased Connectivity and Conservation
- Efficient SCDOT Project Delivery and Development
- Improved Watershed and Ecosystem Health
- Increased Transparency
Ultimate Goals

- Create a methodology that is based on South Carolina resource needs and is scientifically sound

- Continue collaboration and information sharing between state agencies and federal agencies

- Have a functioning web based tool that will identify enhancement/restoration and preservation opportunities for a variety of resources throughout the state of SC
  - This tool can be used for more than wetlands and stream mitigation site identification

- Create solutions that benefit the state of South Carolina
  - Good for resources, Good for agencies, Good for taxpayers and general public
Solutions Begin with an Idea: JUST START
A POTENTIAL SOLUTION (Long Term)

- AMP Generated Process

**ONGOING Process**

- Identify Properties for inclusion
- Submit to IRT for approval
- Amendment approved by IRT
- Reimbursement for project mitigation
- Reimbursement used to fund future mitigation
- Future impacts and mitigation needs identified (REF)
- Credits Released
- Mitigation used for SCDOT projects
Sean Connolly
SCDOT Permitting Division Manager
connollyms@scdot.org
803-737-1398

Thank you!
How to Approach Your Transportation Environmental Needs Eco-Logically

North Central Texas Council of Governments
AASHTO Eco-Logical Community of Practice Webinar
January 31, 2017
Regional Perspective

Population
- 2017: 7.2 million
- 2040: 10.7 million
- 4th Largest MSA by Population

Transportation
- Over 5,000 lane miles of highway
- Longest light-rail system in country
- $118.9 billion identified in Mobility 2040 plan

Area
- 12 counties
- 9,441 square miles
- 2nd Largest Metropolitan Planning Area
NCTCOG Eco-Logical Efforts

- 2008, 2013 FHWA Eco-Logical Grants
- Regional Ecosystem Framework (REF)
- Loop 9 Corridor Area Conservation Vision and Opportunities
- REF Update
- REF Website
- Wetland and Stream Mitigation Assessment
Regional Ecosystem Framework (REF)

- Planning tool developed to identify natural/ecological/agricultural resources
- Developed with feedback from resource agency partners
- Data is aggregated to HUC12 level
- An early screening tool, not a mitigation tool
REF Layers

Green Infrastructure Layers

Water Considerations Layers

Ecosystem Value Layers
REF Data Sources

Green Infrastructure Layers
National Land Cover Database (USGS/DOI)
Vision North Texas (NCTCOG)

Water Considerations Layers
303(d) List (Texas Commission on Environmental Quality)
Flood Zones (FEMA)
National Hydrography Dataset (USGS)
National Land Cover Database (USGS/DOI)

Ecosystem Value Layers
Regional Ecological Assessment Protocol (EPA Region VI)
Impaired Water Segments

- Region is divided into 1/4km² grid
- Select by Location tool is used to target grid cells that contain an impaired water segment
- Grid cells are assigned a score based on presence of an impaired water segment:

<table>
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<th>Grid Cell Attributes</th>
<th>Score</th>
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<td>No Impaired Water Segment Present</td>
<td>1</td>
</tr>
<tr>
<td>Impaired Water Segment Present</td>
<td>5</td>
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</table>
Impaired Water Segments

Grid cell scores are aggregated to subwatershed level by using natural breaks to assign scores from 1 to 5.
Current Applications of REF

• In Mobility 2040:
  ◦ Used in environmental scoring of roadway and transit projects
  ◦ Identified HUC12 subwatersheds through which each project travels

• Included in publicly available REF Website

• Used as an overlay layer to enhance analysis of estimated mitigation credit demand in Wetland and Stream Mitigation Assessment

• Helped develop NCTCOG culture of sensitivity to ecosystem approach
  ◦ Led to funding for Environmental Stewardship Program
Sharing REF Data

REF Interactive Mapping Website
Future Applications of REF

Mobility 2045 goals:

• Identify which environmental resources in each subwatershed may face the greatest impacts generated by roadway and transit projects; will help identify future mitigation needs

• Update environmental scoring method and include score in project-selection process for Mobility 2045
Issues to Address

• Data updates
  ◦ Diversity, Ecosystem Sustainability, and Rarity layers produced by EPA using grant funds – data dates to ~2001
  ◦ Natural Areas layers come from NCTCOG vision plan

• Limited species data

• Cannot compare aggregated change over time
  ◦ About half of layers were not updated in 2014
  ◦ Counties for which data was available changed over time for one layer
  ◦ Original scoring of this layer did not differentiate between no data and lowest score

• Aggregating data should be discussed
  ◦ People like to see one final score, but a lot of information is lost
Four Components of Project

- Quantifying supply and demand of Clean Water Act Section 404 wetland and stream mitigation credits
- Mapping available credits
- Estimating demand generated by roadway projects in Mobility 2040
- Identifying potential locations for mitigation banks that would meet demand and generate the greatest ecological benefit
  - Sought the expertise of resource and regulatory partners
Wetland and Stream Mitigation Assessment

Supply and Demand

* Through November 2015
Mapping Available Credits

Available Perennial In-Channel Credits

Legend
- HUC-8
- Ecoregions
- Zero credits
- 184 credits
- 2691 credits

This map does not differentiate between primary, secondary, and tertiary service areas. "Available" stream credits are those that have been released but not yet withdrawn. The numbers on this map do not account for pre-sales of credits that have not been recorded in RBITS. Credits have been rounded to whole numbers. Data were acquired from the RBITS database and are current as of March 18, 2016.
Wetland and Stream Mitigation Assessment

Estimating Demand Created by Mobility 2040

REF Wildlife Habitat Layer and Estimated Intermittent Stream Impacts

Legend
- No Impact/Non-Widening
- Low
- Medium
- High

HUC-8

MPA Boundary

1 - Least Quantity Wildlife Habitat
2
3
4
5 - More Quantity Wildlife Habitat

The REF Wildlife Habitat score is based on wildlife habitat represented by 2011 NLCD forestlands, shrublands, grasslands, wetlands, and open water. For more information, see www.ndcog.org/REF.
Wetland and Stream Mitigation Assessment

Identifying Potential Mitigation Sites

Viability of Sites for Potential Stream Enhancement

Legend
- 0 Least viable
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11 Most viable
Results of Mitigation Assessment

• Identified supply-side issue with stream mitigation credits

• Led to mitigation emphasis for the private-sector education component of our Environmental Stewardship Program. We are in preliminary discussions with partners to:
  ◦ Encourage builders and developers to avoid, minimize
  ◦ Educate mitigation bankers about our need for stream credits

• Identified State Natural Resource Code that prevents NCTCOG from creating mitigation bank

• Hope to estimate credit demand with each metropolitan transportation plan
Shortcomings of Mitigation Assessment

- Estimated demand is just that – estimated
  - Roadway widths are estimates; actual alignments not yet determined
  - Issues such as single and complete linear transportation projects and separate and distinct crossings of aquatic resources could not be addressed
  - No spatial data on ephemeral streams exists for our region, so no estimates could be made
  - Quality of aquatic resources could not be considered
- Supply is a moving target
- 20-year transportation planning horizon is much longer than mitigation bankers’ planning horizon
Contact Information

Project Info

[www.nctcog.org/ref](http://www.nctcog.org/ref)

Includes links to reports, methodology, REF website

Contact

Kate Zielke
Transportation Planner
817-608-2395
kzielke@nctcog.org
Highway 89 Stewardship Team

Success in Partnership

An Eco-Logical Approach to Planning & Efficient Project Delivery
Who is the Highway 89 Stewardship Team?

The Highway-89 Stewardship Team is a diverse group dedicated to reducing animal-vehicle collisions & preserving wildlife movement corridors through education, research & direct mitigation.

- Sierra County Fish and Wildlife Commission,
- **Sierra County**, 
- USDA Forest Service: [Tahoe National Forest](https://www.fs.usda.gov/tahoenf) & [Pacific Southwest Research Station](https://www.fs.usda.gov/psr),
- California Department of Fish and Game,
- California Department of Transportation (Caltrans)
- University of California Cooperative Extension,
- UC Berkeley-Sagehen Creek Field Station,
- California Deer Association,
- University of California, Davis.
Sierra County, California
What does this presentation offer?

• The Eco-logical approach does not have to be large or expensive
• How to get started
• What makes a small effort successful
• A little planning can lead to large accomplishments
• How to have a lasting effect
The Highway 89 Stewardship Team began with a meeting…..

How to make the first meeting a success:

- Bring together potential partners
- Recognize the problem and identify the goals
- Identify what each agency can achieve through the partnership
- Start discussing goals for the corridor
Next: Bring together what you already know

*Roll out a map or go out in the field*
Identify initial opportunities to fill in the data gaps

Caltrans
- Continue collecting roadkill data
- Investigate and map Traffic accident data
- Evaluate planning documents
- Research funding opportunities

USFS
- Provide Habitat mapping
- Review Forest Plan for goals and priorities
- Meeting facilitation

CDFW
- Wildlife Numbers
- Critical Habitats
- Deer Collaring

UC Davis
- Education Connection
- Leadership and research

UC Berkeley
- Research opportunities and connections
- Education facility
- Funding opportunities

Sierra County
- Transportation priority
- Education grants
- Local Support

Sierra County Fish and Wildlife Commission
- Money for Cameras
- Public Support

California Deer Association
- Grant money for cameras
- Public interest
- Grant money for wildlife collaring
How to tackle a corridor:

In a just a few meetings:

• We broke the corridor down into segments
• We prioritized the segments by roadkill/accident date, area to be affected by increased pressure (traffic, development), areas where other habitat plans contributed to the landscape
• Within our priority segment we evaluated all the locations for habitat connectivity and collision reduction
• We considered new structures and retrofit opportunities
Map data, identify potential mitigation locations, discuss priority criteria
Conduct an initial evaluation of the information you have.

- Effectiveness
- Land Ownership
- Multiple Species
- Habitat Quality

Identify Performance Criteria

Define Each Performance Criteria and set a scale

(Example) Habitat Quality: Does the location improve connectivity between critical habitat

Compare each criteria against each other to give each a weighted rate – ask yourself which criteria will provide the greatest improvement relative to need and purpose

Rate Performance using a criteria matrix

For each location assign a rank on a 1-10 scale for the performance criteria -

For our initial evaluation we re-purposed various tools from the value analysis process to prioritize our locations and then evaluated potential solutions at each location.
<table>
<thead>
<tr>
<th>Category</th>
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<td>Concept No.</td>
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<td>End Milepost</td>
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<td>Disadvantage(s)</td>
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<td>2.1</td>
<td>Undercrossing, Arched, pre-cast, natural barrier</td>
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<td>Masco meets criteria, capability of being modular with other projects, improve permeability</td>
<td>High Cost</td>
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<td>Culvert</td>
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<td>Improvement in drainage, riparian habitat, improve permeability</td>
<td>Privacy ownership on easement to road - not as modular</td>
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<td>Indians have higher shoulder, improves safety</td>
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<td>6.1</td>
<td>For bears open or enclosed trails or transit</td>
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<td>Relocation for amphibians</td>
<td>Not mortality &quot;hotspot&quot;</td>
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<td>6.2</td>
<td>Culvert that enables wetland to achieve equilibrium</td>
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<td>Wetland restoration</td>
<td>Relocation for amphibians</td>
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<td>6.3</td>
<td>Thinning/pruning</td>
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<td>Improve visibility</td>
<td>Some mortality will occur</td>
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<td>6.4</td>
<td>Green reflectors to avoid sightline</td>
<td>2.34</td>
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<td>Reduces confusion between reflectors and exactions</td>
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<td>5.5</td>
<td>Little Truckee Br Options: Modify boulder size and/or place to create shell</td>
<td>2.65</td>
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<td>Fences with human advice</td>
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<td>7.1</td>
<td>Woodside Creek PL Options: Retrofit curving or fencing</td>
<td>3.73</td>
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<td>Dually benefits of public safety and deer mortality</td>
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</table>
And then came a project...

- As the team developed and shared their findings, Sierra County and Caltrans decided to invest in a project.
- With the limited available data the team was called upon to make a recommendation on the location.
- Just by meeting a few times, prioritizing segments, identifying potential locations and supporting the project it is estimated that the Stewardship Team saved the environmental approval phase 6-9 months.
How to maintain momentum

- Share your success
- Re-evaluate the team objectives, location criteria, new data
- Re-evaluate partner priorities
- Continue evaluating the corridor and searching for funding
Share your Success

The team applied for an Eco-logical grant to share and evaluate the framework of the Stewardship success and work on the long-term strategy for Sierra 89. We mentored a team in Northeastern California and the Southern Sierra Nevada in and around Yosemite National Park.

Innovative Approaches to Wildlife and Highway Interactions – UC Berkeley Sagehen Creek Field Station
Modoc 139 (Northern Team)

The problem

The Planning
Highway 139 bisects critical winter range for California Mule Deer, Elk and Pronghorn Antelope that migrate from southern Oregon and Northeastern California. There is a mixture of public and private land with extensive agricultural areas. There is a national wildlife refuge and Lava Beds National monument to the west and a parallel railroad.

- The solution will require substantial partnership with private landowners
- The critical habitat needs should be evaluated
- The public land management agencies need to evaluate if there is vegetation management they can complete to reduce the need for wildlife to move across the highway in severe storm events
- The team needs to study and understand the habitat connectivity needs
State Route 41 in the Sierra National Forest accessing Yosemite National Park (Southern)
The Unique Challenges of the State Route 41 Team

• The mammals being impacted are small so there is no collision data (Pacific Fisher); there is also a Great Grey Owl road mortality concern

• The highway goes through a typical public and private checkerboard of ownership

• The public property is primarily the Sierra National Forest until you get into the Park

• There is a lack of data sharing

• There is substantial key partner turnover

• The National Park is limited to what they can do
What we are learning...

Great Grey Owl road mortality ideas:
• Vegetation trimming
• Public education

Pacific Fisher:
• Share data with Caltrans
• Prioritize Crossing locations
• Determine mitigation measures (fencing, more culverts, more/less cover)
How do we continue Eco-logical?

- Long term research strategy using the new paired undercrossings
- Begin evaluation and priority of the next segment
- Expand the success to more corridors throughout the state
- Create regional data and information sharing

We estimate that for the second project of 2 undercrossings, the eco-logical approach saved the project 9-12 months in planning.

- Continue to work with the new teams
- Share and plan for the mitigation opportunities
- Expand the success to more corridors throughout the state
- Create regional data and information sharing
How to Apply Eco-logical?

- Recognize that a lot can be done with limited resources
- Take a leadership role and pull together a meeting – start the dialogue
- Find out what your partners are looking for, issues they have and common ground
- Evaluate your system, the available plans and upcoming opportunities
- Meetings can occur as little as quarterly and be very effective
- Share what the team is learning (with everyone)
Questions?
Contact Information

Kate Kurgan, AASHTO
kkurgan@aashto.org
202-624-3635

David Williams, FHWA
david.Williams@dot.gov
202-366-4074

Mike Ruth, FHWA
Mike.ruth@dot.gov
202-366-9509

Kevin Moody, FHWA
Kevin.Moody@dot.gov
404-562-3618

Sean Connolly, SCDOT
connollyMS@scdot.org
803-737-1398

Kate Zielke NCTCOG
kzielke@nctcog.org
817-608-2395

Suzanne Melim, Caltrans
suzanne.melim@dot.ca.gov
530-741-4393
Questions?

Please remember to type in your questions to the question prompt.

Thank you for participating!