A Roadway Wildlife Crossing Structure Designed for State-threatened Wood Turtles in New Jersey, United States
Turtle Nesting Habitat & Amphibian Breeding Ponds
River Road is an Intracore Barrier to Wildlife Movement
Total Project Cost -- $116,175
Construction Timeline & State Regulations

Timeline: September 2014 – April 2015; Approximately 15 work days.

“Turtle Tunnels” – Five in total

- Tunnel = Three 10’ Trench Boxes & two 20’ Grate Tops
- Internal dimension with substrate 2’ x 2’
- Spacing: ~160 meters
Cost Breakdown

• Trench Boxes & Grates: $28.5K
• Headwalls: $1500
Finished Headwalls
Grate Tops after Winter
Design Specifications

Angled Fencing – 1350 meters
• Three 1” x 6” pieces Wolmanized wood
• Braced in ground every 4’ with 2” x 4” Wolmanized wood
• Braced in ground every 8’ with 2’ U-Channel post

Cost Breakdown
• Fencing: $14.5K
Step-Overs
Connecting with Headwalls
Cost Breakdown

• Trench Boxes & Grates: $28.5K
• Fencing: $14.5K
• Headwalls: $1500
• Signage: $1375
• Blacktop: $7300
• Equipment Rental: $3000
• Labor (with fringe): $60K

Total Project Cost -- $116,175
Measuring Effectiveness

• Pre-Monitoring
  – Montclair State University 2010 study

• Post-Monitoring
  – Montclair State University 2015 study
  – Wildlife Cameras

Pitfall Trap Monitoring
2010 (Pre-construction)
- March - May 2010
- 24 pitfall traps and silt fencing
  • 782 organisms representing 13 species

2015 (Post-construction)
- April - July 2015
- 10 pitfall traps
  • 2,515 organisms representing 15 species
- Road mortality counts

2015 SPECIES

<table>
<thead>
<tr>
<th>Species</th>
</tr>
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<tbody>
<tr>
<td>Wood Frog</td>
</tr>
<tr>
<td>American Toad</td>
</tr>
<tr>
<td>Green Frog</td>
</tr>
<tr>
<td>Mole/vole</td>
</tr>
<tr>
<td>Spring Peeper</td>
</tr>
<tr>
<td>Snapping Turtle</td>
</tr>
<tr>
<td>Painted Turtle</td>
</tr>
<tr>
<td>Garter Snake</td>
</tr>
<tr>
<td>Four-toed Salamander</td>
</tr>
<tr>
<td>Red Spotted Newt</td>
</tr>
<tr>
<td>Bull Frog</td>
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<tr>
<td>Two-lined salamander</td>
</tr>
<tr>
<td>Box Turtle</td>
</tr>
<tr>
<td>Water Snake</td>
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<tr>
<td>Northern Brown Snake</td>
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Most Active Traps

<table>
<thead>
<tr>
<th>Trap #</th>
<th># of individuals</th>
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<tr>
<td>1</td>
<td>347</td>
</tr>
<tr>
<td>2</td>
<td>340</td>
</tr>
<tr>
<td>3</td>
<td>774</td>
</tr>
<tr>
<td>4</td>
<td>798</td>
</tr>
<tr>
<td>5</td>
<td>256</td>
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</table>

Tunnels by number

April - July 2015
### Road Mortality

#### April - July 2015

<table>
<thead>
<tr>
<th>Species</th>
<th>#</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Northern Gray Treefrog</td>
<td>37</td>
<td>75.51%</td>
</tr>
<tr>
<td>Garter Snake</td>
<td>2</td>
<td>4.08%</td>
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<tr>
<td>American Toad</td>
<td>1</td>
<td>2.04%</td>
</tr>
<tr>
<td>Spring Peeper</td>
<td>1</td>
<td>2.04%</td>
</tr>
<tr>
<td>Unknown</td>
<td>8</td>
<td>16.32%</td>
</tr>
</tbody>
</table>

- Most road mortality occurred between tunnels 3 and 4
Wildlife Cameras

• 5 wildlife cameras were placed on the south side of River Rd to monitor the use of the tunnels
• Cameras were deployed in September 2015

• Culvert users:
  – Red Fox
  – Opossum
  – Skunk
  – Raccoon
  – Feral Cat
  – Chipmunk
Red Fox
*Vulpes vulpes*
Raccoon
Procyon lotor
Opposum
*Didelphia virginiana*
Striped Skunk
Mephitis mephitis
Lessons So Far

• Network of partners is critical
• Construction less expensive in-house than using FHWA $$
• On-site engineering should be expected
• Maintenance of structure necessary
Bedminster Township, Montclair State University, Volunteers

Thank you!

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