



Maine Terrestrial Wildlife Crossings Survey Report  
**Potential for Retrofitting Transportation Infrastructure  
to Benefit Movement of Terrestrial Wildlife**

**Executive Summary**

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## Executive Summary

### Road Infrastructure and Wildlife Movement

Roads and associated traffic act as deterrents or barriers to movement between habitats of many terrestrial wildlife species. When wildlife cross roads, they are at risk of getting killed by vehicles and these collisions can be a safety issue for people too. Mortality from wildlife-vehicle collisions can reduce wildlife populations and for some sensitive species, exacerbate the threat of extinction. Wildlife need to move between habitats to meet their daily life needs, to breed, and to disperse to new territories. Their ability to move and access necessary habitats is becoming even more urgent as their preferred habitats shift across the landscape due to a changing climate.

Wildlife road crossings are a proven solution to help wildlife safely cross roads and prevent collisions with the traveling public. Identifying high priority sites for building wildlife road crossings is important to best meet the needs of wildlife and to use limited funding most effectively. Retrofitting culverts and bridges that are already in place is a cost effective approach for improving wildlife passage under roads. Where there are no wildlife crossing structures, retrofitting existing structures can provide opportunities for wildlife to move safely between habitats on different sides of a road. Retrofits can also be used to complement crossing structures built specifically for wildlife by providing additional safe places for wildlife to cross.

### Road Infrastructure Surveys and Project Goals

During the summer and fall of 2014, Maine Audubon and its partners - the Maine Department of Transportation, Maine Department of Inland Fisheries and Wildlife, and The Nature Conservancy - conducted a pilot project to survey and evaluate existing road crossings in Maine for retrofit potential. This project used the "Permeability of Existing Structures for Terrestrial Wildlife: A Passage Assessment System (PAS)" developed for the Washington State Department of Transportation in cooperation with the U.S. Department of Transportation, Federal Highway Administration (Kintsch and Cramer 2011).

The goals of this pilot project were to investigate the following:

- What types of bridges and culverts are prevalent on the Maine landscape?
- Can existing road crossing structures be retrofitted for wildlife passage?
- Which species groups can benefit from commonly used retrofit solutions?
- What types of retrofit solutions are possible for Maine's existing bridges and culverts?
- Can this survey method be used to inform opportunities for integrating connectivity for terrestrial wildlife into already planned bridge and culvert replacement projects?

#### Thank you to our project partners and collaborators:

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## Road Infrastructure Survey Results

We surveyed 108 structures along 49.3 miles of 12 different roads in two different landscapes, the western Maine mountains in Franklin and Oxford Counties and the southern Maine forests and wetlands in York County. The majority (68%) of surveyed structures are small culverts (<5 feet width and height), while 14% were medium culverts (5 to 8 feet width and height), and 18% were bridges.

### Retrofit Potential:

Of the 108 structures surveyed, we identified 25 as being suitable for retrofit, and 35 as having limited opportunity to be retrofit. In sum, over half (54%) of the inventoried structures have some retrofit opportunity. The remainder offer no retrofit opportunities and will require replacement of existing structures to accommodate terrestrial wildlife passage.

### Species Benefit:

Species that have the greatest potential to benefit from retrofitting include small and medium-bodied *Medium-Structure Generalists* and *Semi-Aquatic Obligates*, such as, mink, painted and wood turtles, raccoon, weasels, bobcat, and fox. (See Appendix A for details)

### Aquatic Road-Crossings:

Many of the structures we surveyed are primarily water road-crossings, where water was present in the structures and/or at the inlet and/or outlet of the structure. We identified seventy-nine sites, or 72%, as having an aquatic component (i.e. either intermittent or perennial water flows). These may preclude or inhibit passage by many species of terrestrial wildlife that do not want to get wet.

Common issues we encountered while surveying aquatic crossings include:

- Lack of stream banks through the culvert to provide a dry pathway;
- Extensive riprap around structure entrances and along stream banks, which can inhibit wildlife from entering into or traveling through the structure.

## Common Retrofit Solutions for Surveyed Structures

At sites where we identified an opportunity to retrofit the structure to enhance terrestrial wildlife passage, we identified the following solutions as the most desirable:

- **Erect Fencing** to guide wildlife to move through structure (58 sites)
- **Create Pathways** through riprap of structure (21 sites)
- **Install a Dry Shelf** inside structure and above the water (17 sites)
- **Fix Perched Outlets** so fish and other wildlife can move through culvert (9 sites)
- **Remove Sediment or Debris** from entrance/exit or inside of structure (7 sites)
- **Add Cover** so wildlife feel safe moving through structure (6 sites)

*(See Section IV of the report for detailed descriptions and maps of each surveyed road segment and recommendations for the structures we surveyed.)*

## Conclusion and Recommendations

The PAS system of surveying road-crossing structures for retrofit potential for terrestrial wildlife is a useful tool to systematically identify structures that can benefit wildlife moving across the landscape through changes to existing infrastructure. It is also useful to identify structures with limited to no opportunity to benefit wildlife movement from retrofitting and where replacement is the only option. The PAS system would be particularly beneficial to assess existing crossings for terrestrial wildlife passage on road corridors slated for upgrades in order to incorporate retrofits early into project plans.

The most common retrofit solution recommended based on survey results was adding fencing. Funneling wildlife to the crossing structure is critical to direct wildlife into the structure and keep animals off the road. In addition to this, modifying structures to fix perched outlets and add clear, safe pathways through the structures is also important.

Because the majority of road-crossing structures on Maine's landscape are aquatic and narrower than the stream banks, it follows that common retrofit solutions for the surveyed structures included constructing dry ledges and pathways and tying them into stream banks.

In the future, we hope that stream crossing replacement projects will consider the needs of terrestrial wildlife movement during planning. Designing and constructing road-stream crossings to meet all the needs of both aquatic and terrestrial species from the outset offers much higher potential for being cost effective in meeting crossing needs for the full range of fish and wildlife moving through the area.

