

NCHRP 25-25, Task 113

ROAD PASSAGES AND BARRIERS FOR SMALL TERRESTRIAL WILDLIFE SPECIES

CASE STUDIES 1 & 2, OVERPASSES

Prepared for:

AASHTO Committee on Environment and Sustainability

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CASE STUDY 1: OVERPASS “GROENE WOUD,” THE NETHERLANDS

This section features a wildlife overpass for which small animal species were among the target species (Figure 8). In this section, we illustrate the connection between identifying a species as a target species for a crossing structure, designing a structure for that target species, and evaluating the effectiveness of the structure in providing habitat connectivity for that target species (van der Grift et al. 2010).



Figure 8: Wildlife overpass “Groene Woud,” across A2 motorway between Boxel and Best, The Netherlands.

Name of Overpass: “Groene Woud” (Green Forest)

Construction Year: 2005

Construction Costs: About € 9 million (about 11.2 million in 2005 US \$)

Location: Motorway A2, between Boxel and Best, The Netherlands

Structure Type: Overpass

Structure Dimensions: 50-m wide (164 ft), spans the A2 motorway for 65 m (213 ft), 100 m (328 ft) approach slope on west side, 85 m (279 ft) on east side.

Target Species: The great crested newt (*Triturus cristatus*), an amphibian species, was explicitly named as one of the target species for this overpass (Figure 9). The overpass was at least partially designed for this species. Other target species include red deer (*Cervus elaphus*), Eurasian badger (*Meles meles*), and various insects, including butterfly species.



Figure 9: Great crested newts (*Triturus cristatus*) have unique patterns on their belly that can be used to identify individual animals in capture-mark-recapture experiments.

Habitat: The wet zone on one side of overpass was specifically created for amphibians.

- Small pools (“stepping stones,” about 30 cm (1 ft deep)) cascading and connecting to larger pools on either side of overpass (Figure 10 and 11).
- Water is kept above ground through lining and loam on the overpass.
- In dry periods, a pump pumps the water from one of the larger pools on the side overpass to the top of overpass. Then the water cascades (flows) back to the larger pools. In 2018, this pump was not working, illustrating that this pump system requires maintenance, which has been lacking.

Berms with soil, root wads, shrubs, and small trees line the two edges of the overpass to reduce visual and noise disturbance from traffic (Figure 12). These berms also provide cover for small animal species. There is about 38 meters (125 ft) of grass-herb vegetation between the two berms (total width of the overpass is 50 meters (164 ft)).



Figure 10: One of the larger pools on the approach of the overpass. Note that the banks are partially open (grass-herb vegetation) and partially covered with shrubs and trees.



Figure 11: The wet zone is protected from cattle (used as a tool in nature management in the area) with a livestock fence (fence is on right side in the image). Note the small dams just above the center of the image that result in small pools during wetter times of the year. One of the berms is on the left side, at one of the outer edges of the overpass.



Figure 12: Detail of the berm in the dry zone. It consists of soil, root wads, shrubs (including thorny species such as bramble (*Rubus* spp.)).

Effectiveness in Providing Connectivity: Research in 2006 through 2008 (February/March through mid-November), data collection occurred two times per week (van der Grift et al. 2010). Transects of wooden “plates” (60 x 60 x 2 cm [about 12x12x1 inch]) were present in the wet zone and in the dry zone (other side overpass). These plates were inspected (lifted) for the potential presence of animals. The researchers and volunteers found 6 species of amphibians (1 toad species, 3 frog species, and 2 salamander species), 2,706 observations of amphibians in total, including 44 observations of great crested newts. The belly pattern of each captured great crested newt was photographed (a pattern that is unique to each animal). Two of the eight recaptures of the great crested newts demonstrated a movement from one side of the motorway to the other side of the motorway. The average time between consecutive captures of same individual was 28 days, indicating that these animals spend a lot of time on the bridge; it is not just a corridor, this is habitat! Creating the wet zone, increased presence of amphibians by 50% compared to the dry zone.

CASE STUDY 2: WILDLIFE OVERPASS “RT. HON. HERB GRAY PARKWAY (THE PARKWAY)”, ONTARIO, CANADA

The Rt. Hon. Herb Gray Parkway (the Parkway) is an 11-kilometer, \$1.4 billion highway infrastructure project located in the municipalities of Windsor, LaSalle, and Tecumseh, in Ontario, Canada. The environment was an important consideration in the highway upgrade project because the Parkway is located in an urban area that contains remnants of Tallgrass Prairie, a globally threatened ecosystem. Tallgrass Prairie and Oak Savannah ecosystems in Windsor are grasslands with a high diversity of plants, birds, mammals, and insects, including several species that are considered to be rare, threatened, or endangered in Ontario.

In addition to restoring and protecting 160 hectares of green space, several green overpasses were created as part of the project (Figure 13). One overpass in particular was built for two “Species at Risk” snakes: the rare Butler’s gartersnake (*Thamnophis butleri*) and Eastern fox snake (*Pantherophis gloydi*) (Figure 14). This overpass connects threatened Tallgrass Prairie habitat (Ontario Ministry of Transportation, 2019; Rt. Hon. Herb Gray Parkway 2019; <https://www.hgparkway.ca/>). The overpass is unique because there is a bicycle path that also has an underpass for snakes to reduce ‘trail-kill’ along the bike path (Figure 15, red circle). The effectiveness of the overpass and underpass system is currently being monitored using passive integrated transponder (PIT) tagging of snakes and radio-telemetry.

For more information download:

<https://www.hgparkway.ca/sites/default/files/downloads/Interpretive%20Sign%2005%20-%20Ecopassage.pdf>

Supporting Repository Materials:

ON-11-ON-39 images and .pdf files



Figure 13: Aerial imagery of a wildlife overpass for snakes in Ontario showing bike path and the vegetation on top of the overpass connecting the habitat on the two sides of the highway. Photo Credit: Ministry of Transportation Ontario, Wood Environment & Infrastructure Solutions.



Figure 14: Aerial imagery of a wildlife overpass for snakes in Ontario showing a bike path and the location of an underpass on top of the overpass (red circle). The image also shows the vegetation on top of the overpass.

of the overpass connecting the tallgrass prairie habitat on the two sides of the highway. Photo Credit: Ministry of Transportation Ontario, Wood Environment & Infrastructure Solutions.



Figure 15: Detail of the underpass for snakes under a bicycle path on top of the wildlife overpass in Windsor, Ontario. Photo Credit: Ministry of Transportation Ontario, Wood Environment & Infrastructure Solutions.

REFERENCES:

Van der Grift, E., F. Ottburg, R. Snep, E. van Ingen, and H. van Beusekom. 2010. Werkt natuurbrug Groene Woud ook voor amfibieën? *De Levende Natuur* 111(2): 87-93.

Rt. Hon. Herb Gray Parkway. 2019. Ecopassage.

<https://www.hgparkway.ca/sites/default/files/downloads/Interpretive%20Sign%2005%20-%20Ecopassage.pdf>.