A regional mitigation blueprint for herpetofauna in Southern Ontario

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Roads are a dominant feature in the landscape bisecting natural habitat often isolating wildlife populations compromising species richness, genetic diversity, and species abundance. As wildlife disperse to access resources, movement corridors and roads often intersect resulting in road-kill hotspots along roads. Hotspots of road-kill are often clustered in specific spatiotemporal extents which present opportunities for road ecologists to predict when and where road mortality may occur. This can assist in placing mitigation measures such as wildlife crossing structures in specific hotspots in the road network where they will be most effective. Here we present a methodology developed to predict where herpetofaunal road mortality hotspots occur in a regional urban landscape in southern Ontario. We focused our analysis in a region of the Niagara peninsula that has been selected for transportation infrastructure development as part of an environmental assessment study. We selected semi-aquatic turtles, e.g. blanding's turtle and pond-breeding amphibians, e.g. wood frog that make annual migrations to breeding and over wintering sites. We mapped and scored wetland-forest sites using a land use geospatial layer for the area. We quantified a habitat suitability index (HSI) for each pixel (15 m by 15 m) in the landscape, by summing the pixels scores within a 200 m radius buffer. We validated the model results using Chi squared statistics with species alive and dead on road location data. We then used a series of criteria to prioritize hotspots that would maximize connectivity in the landscape, e.g. effective mesh size with and without the road. In addition, mitigation areas were prioritized according to their ability to maintain population viability of the target species, e.g. see LARCH model. Examples of final output maps with some recommended mitigation strategies are presented. Future work and recommended implementation plans are discussed.